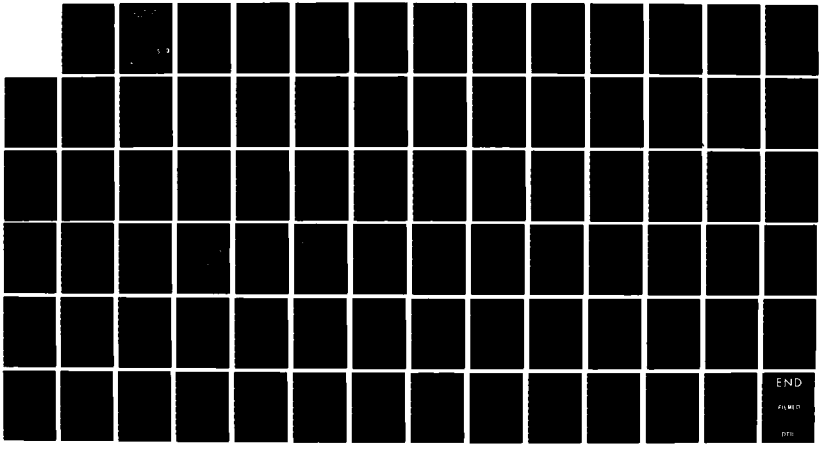
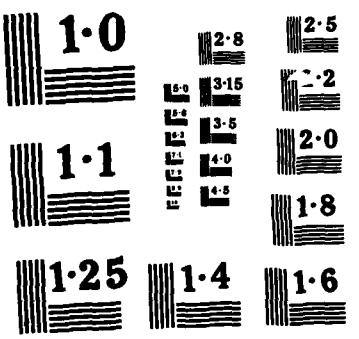
AD-A157 676 AN ATTEMPT TO REFINE DRGS (DIAGNOSIS RELATED GROUPS) FOR NAVY MEDICAL DEP..(U) NAVAL SCHOOL OF HEALTH SCIENCES BETHESDA MD T L KAY ET AL. FEB 85 1/1

UNCLASSIFIED NSHS-RR-2-85 F/G 6/5 NL



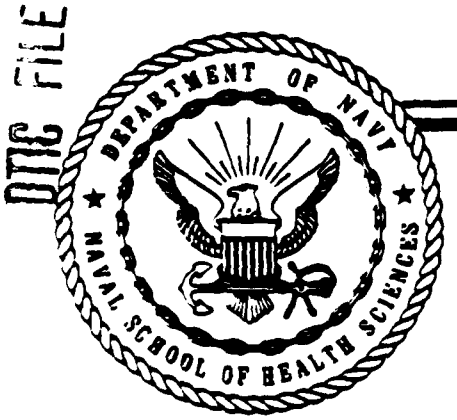


NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

An Attempt to Refine DRGS For Navy Medical Department Use By Including Military Unique Variables And An Estimate Of Disease Severity

Terrence L. Kay
CDR Karen A. Rieder, NC, USN
Rosalie J. Hall

Research Report 2-85
February 1985



Research Department
Naval School of Health Sciences
Bethesda, Maryland 20814-5033

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER Naval School of Health Sciences Bethesda, MD - Research Rpt 2-85	2. GOVT ACCESSION NO. AD-A157676	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) An attempt to Refine DRGs for Navy Medical Department Use by Including Military Unique Variables and an Estimate of Disease Severity		5. TYPE OF REPORT & PERIOD COVERED Ongoing Report February 1985 - continuing
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Terrence L. Kay CDR Karen A. Rieder, NC, USN Rosalie J. Hall		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Research Department Naval School of Health Sciences Bethesda, MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 65152N. M106-PN.001-0005
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Medical Research and Development Command Naval Medical Command National Capital Region Bethesda, MD		12. REPORT DATE February 1985 13. NUMBER OF PAGES 80
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release: distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

CIVAPP: Hospitals
Diagnosis Related Groups (DRGs)
case mix
length of stay variation
severity of illness
military unique variables
patient classification
nursing acuity

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report presents the results of a study to determine if differences in length of stay (LOS) within DRGs could be explained by additional variables on the Navy Inpatient Data System and by a measure of disease severity. Using the same methodology as the Yale researchers, findings indicate that the additional inpatient variables (patient related, hospital characteristics, and military related) increased the explained variance in LOS from 25 to 30 percent and created 345 subgroups. Two-thirds of these subgroups were accounted for by —

DD FORM 1473 EDITION OF 1 NOV 65 IS OBSOLETE

20. (continued)

five factors: number of diagnoses, number of procedures, admitted by transfer, active duty enlisted status, and large teaching hospital. Appendix B details the average length of stay, standard deviation, and number of cases by DRG subgroups.

Severity of illness within seven DRGs was measured by a valid and reliable nursing acuity tool. Findings indicated that maximum patient classification category and points were positively correlated with LOS and explained significantly more variance than accounted for by the additional inpatient variables for most study DRGs. The report concludes with specific recommendations for monitoring and comparing hospital performance using these findings.

AN ATTEMPT TO REFINE DRGs FOR NAVY MEDICAL DEPARTMENT USE BY INCLUDING MILITARY UNIQUE VARIABLES AND AN ESTIMATE OF DISEASE SEVERITY

TERRENCE L. KAY
CDR KAREN A. RIEDER, NC, USN
ROSALIE J. HALL

Research Department
Naval School of Health Sciences
Bethesda, Maryland 20814-5033

This research was sponsored by the Naval Medical Research and Development Command, Department of the Navy, under Research Work Unit M106-PN.001-0005. The views expressed in this report, however, are solely those of the authors. No endorsement by the Department of the Navy has been given or should be inferred.

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

AN ATTEMPT TO REFINE DRGS FOR NAVY MEDICAL DEPARTMENT USE BY INCLUDING MILITARY UNIQUE VARIABLES AND AN ESTIMATE OF DISEASE SEVERITY

Chapter 1

Introduction and Purpose

Background of Diagnosis Related Groups

Several case mix measures that permit health care managers to quantify hospital inpatient workload have recently been introduced. The purpose of these measures (e.g., diagnosis related groups (1), disease staging (2), and disease severity (3)) is to allow managers to account for both the complexity and severity of the patients treated. In this way individual hospital performance can be monitored and compared, and funds can be allocated in proportion to identified resource requirements.

The most widely used case mix measure is the Diagnosis Related Groups (DRGs) system. Developed at Yale University, DRGs very quickly came into prominence when the Health Care Financing Administration (HCFA) adopted them as the basis for the Medicare Prospective Payment System (4). In addition, they have been adopted by the Veterans Administration as the basis for allocating resources to all their hospitals (5). The DRG classification scheme was designed to group inpatients into categories that were: 1) clinically similar and interpretable, 2) readily available from variables in standard hospital abstracts, 3) composed of

all possible disease conditions without being unwieldy in number, 4) similar in expected hospital resource consumption* and 5) comparable across different coding methods (6).

The original DRG developers used diagnostic information from the ICDA-8 coding scheme. Cases were first classified into one of 83 Major Diagnostic Categories (e.g., diabetes, diseases of central nervous system), then further classified into one of 383 DRGs. A revised version of this classification grouping was completed in 1981 using ICD9-CM codes (7) and resulted in the creation of 23 Major Diagnostic Categories and 467 DRGs. The key difference is that a DRG grouping is now based upon specific lists of surgical procedures and secondary diagnoses rather than just the mere presence or absence of surgical procedures or secondary diagnoses.

Purpose of Study

To develop an equitable patient classification system for performance monitoring and resource allocation, it is essential that the patient groupings formed by the system are homogeneous (i.e., patients within the groupings should require similar lengths of hospital stay). One way to determine the extent of homogeneity is to measure the explained variance

---

*Note: Patient length of stay (LOS) was used as a measure of resource consumption because of the general availability and reliability of LOS information.

in length of stay. The purpose of this study was to determine whether the explained variation in length of stay within DRGs could be increased by incorporating additional patient information available to Navy Medical Department managers. If the added patient information was found to increase the percentage of explained variance in length of hospital stay, this additional information could be used to create a more sensitive version of the DRG groupings for use within the Navy Medical Department.

Chapter 2

Review of Previous DRG Related Research by the Navy Health Services Research Department

Our interest in Diagnosis Related Groups resulted from a desire to use a case mix methodology as a tool to account for differences in average length of patient stay among naval hospitals. Initially, DRGs were compared with other patient grouping techniques commonly used by the Navy to account for differences in patient complexity (e.g., patient categories based on the diagnosis code). DRGs explained more variation in length of stay than any of the comparison methods (8). Though DRGs were only slightly better than the ICD-9 three digit diagnosis codes, they required about one-half the number of groups in which to categorize the patient population. Based on these findings, DRGs were selected as the preferred patient grouping technique.

Despite the fact that DRGs proved better than other currently used patient grouping methods, there was concern with what was thought to be a relatively low proportion of explained variance (23%) in length of stay. Civilian researchers had reported explained variance as high as 40% (9). The fact that DRGs within the Navy accounted for only a quarter of the total variance in length of stay suggested that there may be other military unique variables to be explored.

TABLE 6

VARIABLES USED TO FORM
DRG SUBGROUPS
1982

Variable	Number of Subgroups	Percent
Number of diagnoses	65	18.8
Number of procedures	62	18.0
Admitted by transfer	39	11.3
Active duty enlisted status	37	10.7
Large teaching hospital	31	9.0
Other	111	32.2
Total	345	100.0

TABLE 5

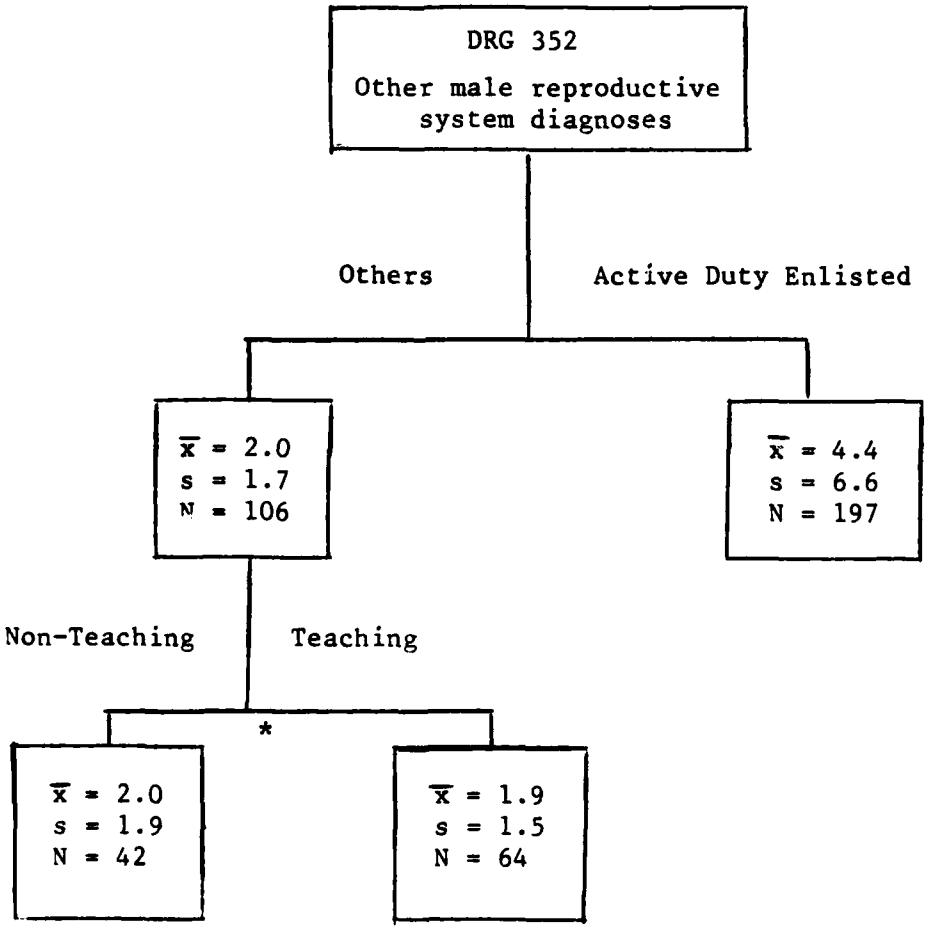
VALIDATION OF 1980 DRG SUBGROUPINGS
USING 1982 DATA

	Number of Groups
1980	
DRGs (out of a possible 467)	456
Additional groupings	674
Total groups	1,130
1982	
DRGs (out of a possible 467)	456
1980 subgroups significant during 1982	345*
Total groups	801

* 332 significant at < .05; 13 significant at < .075 with means and s.d.'s quite different in the two groups.

TABLE 4

SUBGROUPS FOR DRG 352 USING 1982 DATA



* Not significant, this split was not retained.

stay.* After this split neither of the newly formed groups was large enough to justify continuing the splitting process.

Using 1980 data, the subgrouping procedure described above was repeated for each DRG with over 100 cases. To check the consistency of the results, the significance of each split found for 1980 data was cross validated using 1982 data. The rationale behind this was an expectation that the most important factors would be significant for more than one time period. Still using DRG 352 as an example, it was found that 1982 average length of stay data for enlisted personnel was again significantly greater than for the non-enlisted patients (Table 4). However, this data showed no difference in length of stay between teaching and non-teaching hospitals. Therefore, only the subgroups based on enlisted status were retained for DRG 352.

Results

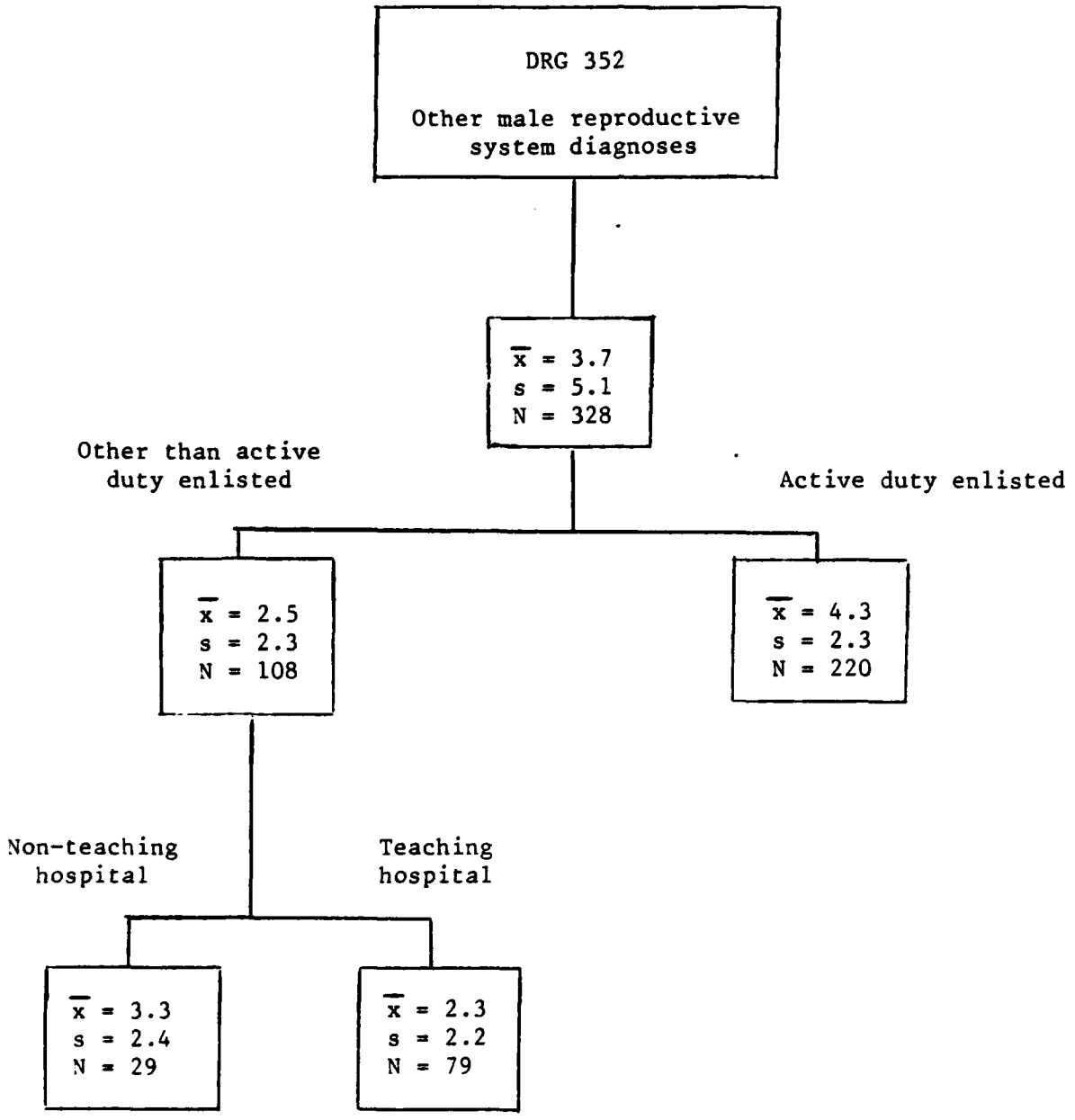
Of the 674 additional groupings created using 1980 data (see Table 5), 332 were also significant ($p < .05$) using 1982 data and 13 additional groups had probability levels of .06 or .07. Since the means of these additional subgroups were quite different, they were retained. Two-thirds of the validated splits (those that were significant for both 1980 and 1982) were accounted for by the five factors listed in Table 6.

---

*This finding was somewhat unusual, since patients in teaching hospitals tend to have longer lengths of stay than those in non-teaching hospitals.

TABLE 3

SUBGROUPS FOR DRG 352 USING 1980 DATA



(1) Statistical significance of the split was not attained (using $p<.05$);

(2) Less than one percent of additional variance in length of stay was explained by the further split;

(3) The group to be split contained fewer than 100 cases;

(4) Splitting would result in a subgroup with fewer than 10 cases;

(5) The difference in the average length of stay for split groups was less than one-half of a day; or

(6) Splitting according to statistical criteria resulted in uninterpretable subgroups (e.g., age groups or number of procedures that seemed to vary unsystematically).

This procedure is best illustrated with an example.

Table 3 shows the splitting process described above for DRG 352, other male reproductive system diagnoses. All cases within this DRG were first subdivided on the basis of active duty enlisted status. For DRG 352, active duty enlisted patients stayed an average of two days longer than a group composed of all other patients. Therefore, two tentative subgroups were formed which categorized the "active duty enlisted" patients and all "other" patients into separate groups. Second, each subgroup was further analyzed to see if there were other variables influencing patient length of stay. For the active duty enlisted group there were no additional splitting variables. However, for the "other" group, there was a statistically significant difference between patients treated at teaching hospitals and those treated in non-teaching hospitals. In this case, there was a one day difference in length of stay between the two types of hospitals, with the teaching hospitals having the shorter

etc.). Therefore, physicians are likely to keep enlisted patients until they are well enough to return to full duty.

It should be noted that an analysis of differences in length of stay by individual diagnoses and procedures was considered. There is, for example, a possibility that considerable variation exists in length of stay among the individual diagnosis codes contained in each DRG. At the time this study began, it was expected that within one to two years HCFA would reassign a significant number of diagnosis and procedure codes to different DRGs. Therefore, individual diagnosis and procedure codes were not analyzed in this study because of the significant amount of time, resources, and clinical expertise required to undertake this analysis.

Methodology and Procedures

The procedure adopted to study the effect of variables from the Inpatient Data System was similar to that used by the Yale researchers to develop the original DRGs. This procedure is based on both the empirical and clinical criteria detailed in an earlier technical report (13). Briefly, each DRG was analyzed to see if the selected variables of interest could explain additional variance in length of stay, therefore, creating more homogeneous patient groups. Each DRG was split into subgroups based upon the results of a stepwise multiple regression analysis which selected the one variable that accounted for the most variance in length of stay. Subdivision of the subgroup continued until one of the following criteria was met:

(3) Military related variables:

active duty status
officer-enlisted status
length of service
pre-existence of conditions prior to entry.

These variables were included in the analysis based upon a review of the literature and discussions with Navy Medical Department managers. For example, older patients and patients transferred from other facilities tend to require a longer hospital stay; therefore, most case mix classification systems include age of the patient as an explanatory variable (11). Discharge status is an important factor for Navy hospitals because patients transferred from one hospital to another tend to require longer treatment periods. One would also expect more severely ill patients to require a longer length of hospital stay; in this analysis the number of diagnoses and number of procedures were included as surrogates for disease severity.* Since patients treated at large teaching hospitals tend to stay longer than patients treated at smaller community hospitals (12), this hospital characteristic was also explored. The military related variable of officer-enlisted status was included based on the hypothesis that junior enlisted are more likely to live in the barracks and thus have less access to social support systems (e.g., spouse, family,

---

*These variables are not ideal measures of severity since there is a possibility that the longer a patient stays in a hospital, the more likely that additional medical problems will be identified and coded on the record. Further, if a hospital's performance rating is dependent upon the number of coded diagnoses or procedures, there may exist an incentive to simply document additional codes in a patient's record. In spite of these problems, it was assumed that possible differences in patient severity level could be obtained by these variables.

Chapter 3

Using Patient and Hospital Data From the Inpatient Data System to Account for Variation in Length of Stay Within DRGs

The simplest approach to obtaining more homogeneous groupings would be to further subdivide the current DRGs using the extra data contained in the Navy Inpatient Data System. Advantages to this approach are:

(1) Navy modified DRGs could easily be collapsed back to their original form, thus permitting performance comparisons with civilian hospitals if desired, and

(2) The data required for subdividing DRGs in this way are readily available; therefore, the expense of collecting additional data is avoided.

Because of these advantages, the relationship between certain Inpatient Data System variables and length of stay on a DRG-by-DRG basis was inspected. The Inpatient variables analyzed fell into three general types:

(1) Patient related variables:

age
admission status (direct admission vs. transfer)
discharge status (discharge home/duty vs. transfer)
sex
race
number of medical diagnoses
number of surgical procedures;

(2) Hospital characteristics:

size
location
teaching status; and

severity was operationalized by determining patient acuity levels. Patient acuity was measured by the patient classification critical indicator tool which is part of the Workload Management System for Nursing (10). The results of this strategy to account for patient length of stay within DRGs are discussed in Chapter 4.

TABLE 2

COEFFICIENT OF VARIATION FOR
DRG NUMBERS 1-10

DRG Number	Description	Number of Cases	Coefficient of Variation
1	Craniotomy age = 18 except for trauma	112	86.3
2	Craniotomy for trauma age = 18	23	77.5
3	Craniotomy age 18	34	91.9
4	Spinal procedures	141	118.8
5	Extracranial vascular procedures	140	125.1
6	Carpal tunnel release	0*	-
7	Periph & cranial nerve & other nerv syst proc age = 70 and/or c.c.	36	155.1
8	Periph & cranial nerve & other nerv syst proc age 70 w/o c.c.	457	194.6
9	Spinal disorders & injuries	53	158.7
10	Nervous system neoplasms age = 70 and/or c.c.	42	90.7

* There are no ICPM codes that uniquely identify this procedure.

lower the relative amount of variation existing in the sample and, therefore, the more homogeneous the DRG grouping. A coefficient of variation of 70.0 was arbitrarily chosen as a cutoff point for identifying DRGs that included patients requiring widely differing lengths of hospital stay.

The results revealed that over 80% of the DRGs had a coefficient of variation exceeding the 70.0 cutoff point. Table 2 displays only the results for the first ten DRGs, but these results are typical of what was found for most of the case mix groupings (See Appendix (A)). The question to be answered became why was there so much variation within these supposedly homogeneous groupings.

Two Strategies to Account for Additional Variation in Length of Patient Stay

In an attempt to answer the question and to explain additional variation in length of stay within DRGs, our research has progressed in two directions. First, selected variables that were already available on the Inpatient Data System were examined to see if they would explain additional variance in length of stay. The additional factors analyzed included: 1) patient related variables, 2) hospital characteristic variables, and 3) military unique variables. The findings from this approach are provided in Chapter 3. Second, a pilot test was conducted to determine whether differences in length of stay within DRGs could be explained by disease severity. For this portion of the study, disease

TABLE 1

EXPLAINED VARIATION IN LENGTH OF STAY
BY SELECTED RECORDS,
1982

Selection Criteria	Number of Records	Explained Variation (Percent) Length of Stay	Length of Stay (log)
All records	196,916	23	29
Exclude transfer (in or out)	185,704	26	32
HCFA trim points	191,131	31	31
Yale trim points	183,115	41	40

Initial Efforts to Account for Unexplained Variances Within DRGs

Initial efforts to increase explained variance in LOS involved excluding outlier data (patients with unusually long or short lengths of stay). The removal of these atypical cases can make the DRG classification scheme a more representative indicator of the normal or usual resource consumption associated with each patient group. Three previously developed methods for treating outliers were studied: Yale trim points, HCFA trim points, and log length of stay. (See summary of results in Table 1). In addition, because patients transferred in or out of a hospital tend to be outliers, the effect of removing them from the analysis was also studied. Each method of removing outliers, especially the Yale trim points, resulted in DRGs explaining more variance in length of stay for the patients remaining. The Yale trim points increased the explained variance to a greater extent than the HCFA trim points because they include cut points for both abnormally short and abnormally long lengths of stay. The HCFA cut points address only abnormally long lengths of stay. Using the log length of stay also reduced the effect of outlier cases for untrimmed data; however, the use of log length of stay as a dependent variable had no effect on trimmed data.

Next, each DRG was analyzed (using untrimmed data) to ascertain which ones possessed large amounts of unexplained variance. The statistic used to identify these DRGs was the coefficient of variation, which is the ratio of the standard deviation of the LOS divided by the mean LOS and expressed as a percentage. The lower the value of the ratio, the

The primary factors predicting length of stay were number of diagnoses and number of procedures. As the number of diagnoses or the number of procedures increased, so did the average length of stay. As might be expected, transfer status was also a significant factor; patients transferred from one facility to another tended to stay longer than direct admissions. A military unique factor that was a significant variable was active duty enlisted status; enlisted patients tended to stay one or two days longer than other patients. Another important variable was the characteristic of the hospital at which the patient was treated. Patients treated at large teaching hospitals tended to have longer lengths of stay than patients treated at other hospitals. Complete results of the subgrouping process for each DRG are summarized in Appendix B. These additional 345 subgroups increased the variance explained from 23% to 30%.

Discussion

The two leading variables for explaining patient length of stay within DRGs were the number of diagnoses and the number of procedures. These two factors, as noted earlier, are not ideal proxies for patient severity of illness because of the potential for misuse. Overall, the additional variation explained by the extra 345 DRG subgroups was not dramatic, since they only increased the variance explained by 7%. However, these additional subgroups can be useful in at least two ways. One option is to modify the DRGs for military use by adding the additional subgroups. If this strategy is selected, some labeling convention would be necessary so that the data can be collapsed back to the original DRG

level; this would enable managers to compare Navy data with data from civilian hospitals or from the other military services. Another alternative is to simply use the DRGs as they have been defined by their developers, but when unexpected differences among specific hospitals emerge, a manager would refer to the subgroups for possible explanation.

Chapter 4

Using Patient Acuity to Account for Variation in Length of Stay

It has been suggested that one shortcoming of using DRGs to classify case mix is that the groupings do not completely account for differences in the severity of illness (14). Although two patients may be assigned to the same DRG, one patient may be more severely ill than the other and require a longer period of hospitalization. The current DRG classification scheme, however, does consider some aspects of disease severity. For example, the assignment of patients to many DRGs depends not only upon the principal diagnosis, but also upon the age of the patient or the presence of specific lists of complications, co-morbidities, and surgical procedures. In spite of these attempts to account for severity within the DRG classification scheme, it is suggested that there could be many instances where potential differences in disease severity would not be reflected.

The measurement of severity of illness is in itself a major area of research. There are a number of current methodologies for measuring severity (15), each shrouded by some controversy regarding their reliability, objectivity, and conceptual clarity (16). In this study a factor-evaluative patient classification tool which groups patients according to an assessment of their required nursing care activities for a specified period was used as an indirect measure of disease severity. The guiding premise was that the more seriously ill the patient, the more nursing care time that patient would require. Since it has been shown

that disease severity is a major contributor to hospital stay (17), it was speculated that this relationship with length of stay would hold for required nursing care. The major advantage of using the patient classification tool as an indirect measure of disease severity was that this information had been determined to be reliable and valid (18) and was already being collected for staffing purposes at 33 hospitals. Therefore, classification data was more readily available than a direct disease severity measure, which would require additional coders to review individual patient records.

Study Hypotheses

The three major hypotheses investigated in this pilot study were that within each selected DRG:

(1) Patient classification data as measured by patient category (the mean, mode, and maximum class) and by classification scores (mean and maximum) would be positively correlated with length of stay;

(2) Patient classification data would explain a significant amount of variation in length of stay; and

(3) The additional variance explained by the patient classification data would be significant, even after accounting for other military unique variables available on the inpatient abstract.

Methodology and Procedures

Sample Selection Criteria

Patients at five naval hospitals (NH Charleston, NH Portsmouth,

NH Orlando, NH Oakland, and NH Rota) who were inpatients for the months September thru December 1983 were included in this pilot study. The cases selected were those patients assigned to one of the DRGs listed in Table 7. These DRGs were chosen because data from an earlier study indicated that: (a) they contained a large amount of unexplained variance (as indicated by a coefficient of variation of over .70) and (b) a large number of cases were classified into these DRGs over the course of a year.

Source of Data

The data used in this study required the matching of patient information from two sources: (1) Inpatient Data System (19), which supplied DRG information and patient descriptive data (age, sex, military status, etc.); and (2) the Workload Management System for Nursing (WMSN) (20), which provided nursing care requirements information. As part of the WMSN, patients in naval hospitals are rated on a daily basis according to their required nursing care activities. Each activity is assigned a specific point value based upon documented time and motion studies. Totaling these points results in identifying the nursing care hours required for each patient over a 24 hour period. Based on these hours patients are grouped into one of six categories of care. For example: a Category I patient requiring minimal care is assigned 2 hours of nursing time, while a Category VI (on an open ward at a teaching hospital) patient requiring intensive care is allotted 41 hours of nursing staff time.

TABLE 7

AVERAGE LENGTH OF STAY, STANDARD DEVIATION (STD DEV), AND NUMBER OF CASES FOR SELECTED DRGS, 1980 AND 1982

DRG Number	DRG Description	1980 Mean	1980 Std Dev	1980 Number of Cases	1982 Mean	1982 Std Dev	1982 Number of Cases
25	Seizure and Headache, Age 18-69, w/o c.c.	5.1	6.0	1145	5.6	8.1	1096
82	Respiratory Neoplasms	10.0	11.3	686	10.5	12.3	592
133	Atherosclerosis Age < 70, w/o c.c.	4.6	5.7	635	4.7	6.6	741
169	Procedures on the Mouth, Age < 70	6.7	6.9	1000	5.9	5.5	974
231	Local Excision and Removal of Internal Fixative Devices Except Hip and Femur	6.0	8.4	984	5.1	9.0	848
243	Medical Back Problems	10.5	9.2	2784	7.3	8.5	2655
254	Fractures, Sprains, Strains, and Dislocations of Upperarm, Lower Leg, Except Foot, Age 18-69, w/o c.c.	5.0	7.8	2772	3.7	5.4	2264
324	Urinary Stones	3.0	5.2	752	2.7	2.5	676
421	Viral Illness, Age ≥ 18	4.4	4.2	1627	3.9	3.4	1070
450	Toxic Effects of Drugs, Age 18-69, w/o c.c.	2.9	5.7	911	2.5	3.9	726

Matching of Inpatient Data With Patient Classification Data

The matching of the two data sources was done manually. This was a major task, requiring the visual scanning of 2500 handwritten nursing care ratings to match the appropriate inpatient records. First, a report was produced from the Inpatient Data System which listed the name, admission and disposition dates, facility, and DRG assignment for each inpatient meeting the sample selection criteria. Using this listing made it possible to visually scan the daily patient classification worksheets in order to match the nursing care ratings with the inpatient data file. A total of 510 cases were drawn from the inpatient data file and matched with hospital nursing care classification data. Of the 510 total cases, 63 were excluded from this analyses because less than one-half of their patient classification ratings were located.

Representativeness of the Sample

Since the sample was drawn from a limited number of hospitals over a period of only four months, the representativeness of the data was examined. If the mean and average length of stay for a study DRG was quite different from the mean and standard deviations for that DRG in previous years, the data might be influenced by the sampling process. We had available the means and standard deviations by DRG for all naval hospitals during 1980 and 1982. A comparison of these means (Table 7) with the sample means displayed in Table 8 showed that eight of the

TABLE 8

AVERAGE LENGTH OF STAY BY DRG FOR STUDY SAMPLE*

DRG	Length of Patient Stay: Number of Cases	Mean	Standard Deviation
25	41	4.5	3.9
82	14	3.2	1.8
133	30	3.0	2.2
169	47	5.7	3.8
231	46	5.4	5.6
243	156	6.8	4.9
254	61	4.2	3.6
324	19	3.4	3.2
421	23	4.6	3.5
450	10	1.8	1.1

* Includes patients for whom at least one half of their daily patient classification ratings could be located.

DRGs had sample means similar to at least one of the 1980 or 1982 mean values. Two of the DRG sample means were different enough to question their representativeness of the cases treated at naval hospitals. DRG 82 (Respiratory Neoplasms) had average lengths of stays of 10.0 days and 10.5 days, respectively. The sample had an average LOS of only 4.4 days. DRG 133 (Atherosclerosis) had an average LOS of 4.6 days and 4.7 days in 1980 and 1982. In the sample, the average LOS was 2.9 days. Because of this disparity and the small number of cases (10 for DRG 82 and 24 for DRG 133), these DRGs were excluded from the study. In addition, DRG 450 (toxic effects of drugs) was excluded because there were only 10 patients assigned to this DRG.

Independent Variables

The following three forms of the patient classification category variable were used as summary measures to explain variance in length of stay:

(1) The mean patient classification category was used to summarize the patient's nursing care pattern over an entire hospital stay;

(2) The modal patient classification category was used as a measure of the patient's most typical classification. One advantage of the mode over the mean is that it is less sensitive to extremely high or extremely low classifications; and

(3) The maximum classification category was selected as a measure of the patient's most extreme disease severity level. It was thought that patients with an extremely high patient classification rating for even a brief time during their hospital stay might be more severely ill. These individuals might require a longer stay than those patients having less extreme patient classification ratings.

Similarly, two forms of the patient classification points, the mean and the maximum, were tested for their ability to explain variance in length of stay. The mode was not used for the analysis of points data since patients seldom receive the same number of points during two or more days of their hospital stay.

The other explanatory variables chosen to account for length of stay were those selected and studied in Chapter 3. By including these variables from the Inpatient file, we could ascertain the extent to which variance explained by the patient classification variables overlapped with that explained by the inpatient variables. It was decided that patient classification should explain significantly more variance than already explained by the other inpatient variables to justify the cost and effort required to add this information to the Inpatient Data System.

Results

It had been hypothesized that the patient classification variables and length of stay would be positively correlated. This was true only for the maximum patient classification measure (See Table 9). All seven DRGs examined in this pilot test had positive correlation coefficients describing the linear relationship between maximum patient classification category and length of stay. Four of these correlations were statistically significant at the .05 level of probability. In contrast, no statistically significant (.05 level) positive correlations were obtained

Table 9

CORRELATION BETWEEN SELECTED FORMS OF PATIENT CLASSIFICATION DATA AND LENGTH OF PATIENT STAY, BY SELECTED DRG

DRG	Number of Cases	Patient Classification		
		Mean	Mode	Maximum
25	41	.26**	.28**	.35*
169	47	.07	.03	.26**
231	46	-.20	.19	.38*
243	156	-.02	-.06	.21*
254	61	-.23**	-.11	.95
324	19	-.36	-.48*	.10
421	23	-.19	-.02	.49*

* Statistically significant at $p < .05$.
** Statistically significant at $p \leq .10$.

between length of stay and mean or modal patient classification category. For the mean patient classification, five of the seven correlation coefficients for the selected DRGs were negative. Similar results were obtained when the maximum patient classification points were used (See Table 10). Since a positive correlation between patient classification and length of stay was essential to the original concept of the study, only the maximum patient classification measures were used for testing the second and third hypothesis.

For the second hypothesis, the amount of variance explained by the maximum patient classification category was analyzed. As seen in Table 11, the explained variance ranged from 0.9% for DRG 254 to 24.6% for DRG 421. The amount of variance explained for four of the seven DRGs (25, 231, 243, 421) was significant at the .05 level of probability. Table 12 displays the results obtained when using patient classification points. For the maximum classification points data the explained variance was higher than that obtained when using the maximum classification data for five of the seven DRGs.

The third hypothesis tested whether the additional variance explained by the patient classification data was still significant after accounting for the other variables available in the Inpatient Data System. This analysis addressed the issue of whether it would be cost effective to collect and use patient classification data to account for length of stay. For each selected DRG the contribution of the maximum patient

Table 10

CORRELATION BETWEEN SELECTED FORMS OF PATIENT CLASSIFICATION POINTS AND LENGTH OF PATIENT STAY, BY SELECTED DRG

DRG	Number of Cases	Correlation Coefficient (Pearson r) Mean Points	Correlation Coefficient (Pearson r) Maximum Points
25	39	.37*	.55*
169	27	-.01	.26
231	22	.27	.49*
243	130	.12	.33*
254	33	-.05	.41*
324	15	-.36	.06
421	22	.07	.41**

Note: Includes cases with classification points data for at least one half the patient's stay.

* Statistically significant at $p \leq .05$.
** Statistically significant at $p \leq .10$.

TABLE 11

VARIANCE IN LENGTH OF PATIENT STAY EXPLAINED BY MAXIMUM PATIENT CLASSIFICATION CATEGORY, BY SELECTED DRG

DRG	Number of Cases	Explained Variance (percent)
25	41	12.54*
169	47	6.86**
231	46	14.38*
243	156	4.27*
254	61	0.90
324	19	1.05
421	23	24.06*

* Statistically significant at $p \leq .05$.
** Statistically significant at $p \leq .10$.

APPENDIX A

AVERAGE LENGTH OF STAY, STANDARD DEVIATION, COEFFICIENT OF VARIATION, AND NUMBER OF CASES, BY DRG, NAVAL HOSPITALS, 1982

DRG	MEAN	STD DEV	COEF OF VAR	CASES
1	23.5	20.3	86.3	112
2	21.3	16.5	77.6	23
3	10.2	9.4	91.9	34
4	9.0	10.7	118.9	141
5	8.5	10.7	125.2	140
7	10.3	15.9	155.1	36
8	4.5	8.7	194.7	457
9	9.9	15.7	158.7	53
10	12.5	11.4	90.8	42
11	7.8	10.4	133.0	78
12	10.1	12.4	122.6	166
13	6.8	8.6	125.9	90
14	11.0	10.7	97.4	435
15	4.1	4.5	108.0	317
16	8.0	7.3	91.0	20
17	7.2	7.1	98.2	62
18	9.0	14.6	162.8	47
19	6.8	11.3	166.4	429
20	8.1	7.9	97.9	558
21	4.0	3.2	81.3	313
22	4.0	0.0	0.0	2
23	6.4	9.1	142.4	61
24	6.8	10.4	152.3	166
25	5.6	8.1	146.0	1096
26	2.9	3.8	132.9	499
28	6.9	13.6	197.8	187
29	4.7	12.1	256.2	435
30	1.9	2.9	157.5	275
31	3.0	6.5	217.0	199
32	2.0	4.1	205.9	721
33	1.2	0.6	50.5	229
34	9.4	13.3	141.2	57
35	5.1	7.0	138.0	276
36	10.3	7.0	68.1	101
37	5.7	10.7	188.5	112
38	2.4	1.4	57.1	36
39	3.4	3.3	97.0	1123
40	2.4	3.3	137.9	841
41	1.6	1.8	106.6	482
42	7.7	10.0	130.1	141
43	5.6	3.3	58.5	158
44	7.2	8.3	116.4	24
45	3.8	4.7	124.3	89
46	4.7	5.3	112.6	62

APPENDIX A

11. Plomann, M. P., Case Mix Classification Systems: Development, Description, and Testing, The Hospital Research and Educational Trust, Chicago, Illinois, 1982.

12. Becker, E. R. and Bruce Steinwald. "Determinants of Hospital Case Mix Complexity," Health Services Research, Winter 1981.

13. Kay and Rieder, Accounting for Variation.

14. Krietzer, Sharon L., Elaine S. Loebner, and George C. Roveti. "Severity of Illness: The DRGs Missing Link," Quality Review Bulletin, Vol. 8 (May 1982), pp. 26-34.

15. Horn, Susan. "The Impact of Severity of Illness on DRG Based Cost Analysis," (pages 35-104). In Proceedings of the Tri Service Performance Measurement Conference, edited by LTC John P. Coventry, Report #84-002, October 1984, U.S. Army Health Services Command, Fort Sam Houston, TX 78234.

16. Jencks, Stephen. "The HCFA Experience and Work Measurement for the Military," (p. 28 and p. 33). In Proceedings of the Tri Service Performance Measurement Conference, edited by LTC John P. Coventry, Report #84-002, October 1984, U.S. Army Health Services Command, Fort Sam Houston, TX 78234.

17. Horn, Impact of Severity Illness," pp. 35-104.

18. Rieder and Jackson, An Evaluative Study - Preliminary Report.

19. Navy Inpatient Data System, Naval Medical Command, Washington, DC 20372.

20. Rieder and Jackson, An Evaluative Study - Preliminary Report.

References

1. Hartzke, Larry. DRGS (Diagnosis Related Groups): Concept and Use, Institute for Health Planning, Madison, WI 53705, August 1983. (Available from National Technical Information Service, Springfield, VA 22161, price code: PC A06/MF A01).

2. Louis, Daniel Z. Disease Staging: A Clinically Based Approach to Measurement of Disease Severity, Vol. 1, Executive Summary. SysteMetrics, Inc., 104 West Anapamu Street, Santa Barbara, CA 93101. (Available from National Technical Information Service, Springfield, VA 22161, price code: PB 83/254656).

3. Horn, Susan D.; Phoebe D. Sharkey,; Dennis A. Bertram. "Measuring Severity of Illness: Homogeneous Case Mix Groups," Medical Care, January 1983, Vol. XXI, No. 1.

4. Social Security Amendments of 1983 (Public Law 98-21), Section 1886(d), April 20, 1983.

5. "U.S. Medicine Interviews Carleton Evans (Director of Allocation Development at the Veterans Administration)," U.S. Medicine, April 15, 1984, page 2,

6. Fetter, R. B., Y. Shin, J. L. Freeman, R. F. Averill, and J. D. Thompson. "Case Mix Definitions by Diagnosis Related Groups." Medical Care Supplement, February 1980.

7. Fetter, R. B., J. D. Thompson, R. F. Averill, and A. T. Freedman. "The New ICD-9-CM Diagnosis Related Groups Classification Scheme." New Haven, CT: Health Systems Management Group, School of Organization and Management, Yale University, Final Report, May 1982.

8. Kay. T. L. and K. A. Rieder. "Accounting for Variation in Patient Length of Stay in Naval Hospitals Using Diagnosis Related Groups (DRGs) as a Case Grouping Method: Preliminary Results," Research Paper 1-83, October 1983, Research Department, Naval School of Health Sciences, Bethesda, MD 20814-5033.

9. New Jersey State Department of Health, New Jersey Evaluation of ICD9-CM DRGs, Health Care Financing Administration. Contract Number 600-77-0022, Trenton, NJ, December 1981.

10. Rieder, K. A. and S. S. Jackson. "An Evaluative Study of the Navy Medical Department's Patient Classification System and Staffing Allocation - Preliminary Report," Research Paper 1-84, August 1984, Research Department, Naval School of Health Sciences, Bethesda, MD 20814-5033.

tended to stay somewhat longer than other inpatients. The attempt to explain additional variance by using the patient acuity data showed that, for at least some DRGs, knowledge of the patient's maximum acuity level aides in the prediction of length of stay.

Based on these findings, it is recommended that:

(1) Additional Inpatient Data System variables identified in this report should be considered when using DRGs to compare hospital performance. For example, if unexpected differences among specific hospitals are obtained, a manager should refer to these additional DRG subgroups for possible explanation.

(2) Based on the initial findings, a more complete test using patient acuity ratings as an estimate of disease severity should be conducted. One approach would be to select a sample of six hospitals and require that the staff forward patient acuity data along with the data required for the Inpatient Data System. These data could be collected for a time period of up to six months.

(3) Once the patient acuity data is collected and analyzed, the results should be compared with other severity of illness measures (disease staging, severity of illness, etc.).

These efforts have identified modifications to the DRG system that could make it more useful for the Navy Medical Department. The U.S. Army Health Care Studies and Clinical Investigation Activity (HCSCIA) at Fort Sam Houston is investigating the need for DRG subgroupings within the Army inpatient population. A set of mutually agreed upon DRG subgroups would allow for intra-service comparisons and would avoid the confusion that could arise if each service uses different DRG definitions. It is hoped that researchers from the U.S. Air Force will soon join this effort.

Chapter 5

Study Conclusion and Recommendations

The DRG methodology attempts to group inpatients into relatively homogeneous patient groupings. This patient grouping technique was developed using a civilian population that is undoubtedly much different from the inpatient population served by Navy hospitals.

In this study an attempt was made to refine DRGs for Navy Medical Department use by identifying additional variables that have an impact on average length of patient stay. By incorporating these variables, it may be possible to develop a version of the DRGs that is more sensitive to the Navy inpatient populations being served. Variables studied included those currently available from the Navy Inpatient Data System (patient related, hospital characteristics, and military unique variables) and disease severity, as operationalized by the patient acuity tool that is part of the Workload Management System for Nursing.

An analysis of the data from the Inpatient Data System showed that these variables could explain significant variation within 169 of the total 456 DRGs that contained data. By including these variables, the variance explained increased a relatively modest amount, from 23% to 30%. However, two variables that may be of particular interest to Navy Medical Department managers were patient transfer status and active duty enlisted status. Patients transferred from another hospital and enlisted patients

lengths of stay tend to be concentrated during the first few days of hospitalization. Following this short period of intense nursing care, these patients require a lower percentage of staff time during the remainder of their stay. This subsequent lower level of required care deflates the value of the average patient classification. For these patients, the average classification category may be an inadequate measure to express the intensity of the care required. As a severity of illness measure it appears necessary to analyze the patient classification data using the maximum class or maximum points at which a patient was rated. Positive correlations between maximum patient classification and length of stay were found for all seven DRGs examined.

For the second hypothesis we found that the variance accounted for by the maximum patient classification category and maximum classification points was significant for most of the DRGs examined. Lastly, the third hypothesis verified that maximum patient classification category and points explained significantly more variance than that accounted for by readily accessed inpatient variables for most of the study DRGs.

Because of the small sample in this pilot study, a definitive test of the study hypothesis was not feasible. The results do indicate, however, that for at least some DRGs, knowledge of the patient's maximum patient classification aids in the prediction of length of stay.

ranged from 11.8% for DRG 243 to 47.3% for DRG 25. Because it more finely discriminates among levels of required nursing care, one would generally expect to obtain better results when using the points data.

Discussion

In this pilot study of seven selected DRGs (using data from five naval hospitals for the months September - December 1983), three hypotheses were investigated:

(1) Whether there was a positive correlation between nursing patient classification summary measures and length of stay;

(2) Whether patient classification data explained a significant amount of variance in length of stay; and

(3) Whether the additional variance explained by the nurse patient classification critical indicator tool would be significant even after accounting for other inpatient variables more readily available.

For this study, three summary measures of the nurse patient classification scale were used: the mean, modal, and maximum patient classification category during a patient's hospital stay. The summary measures for the patient classification points were the mean and maximum.

Study findings related to the first hypothesis indicated that there was a negative rather than a positive correlation between mean and model patient classification and length of stay. One explanation is that nursing care hour requirements for seriously ill patients with long

FIGURE 2

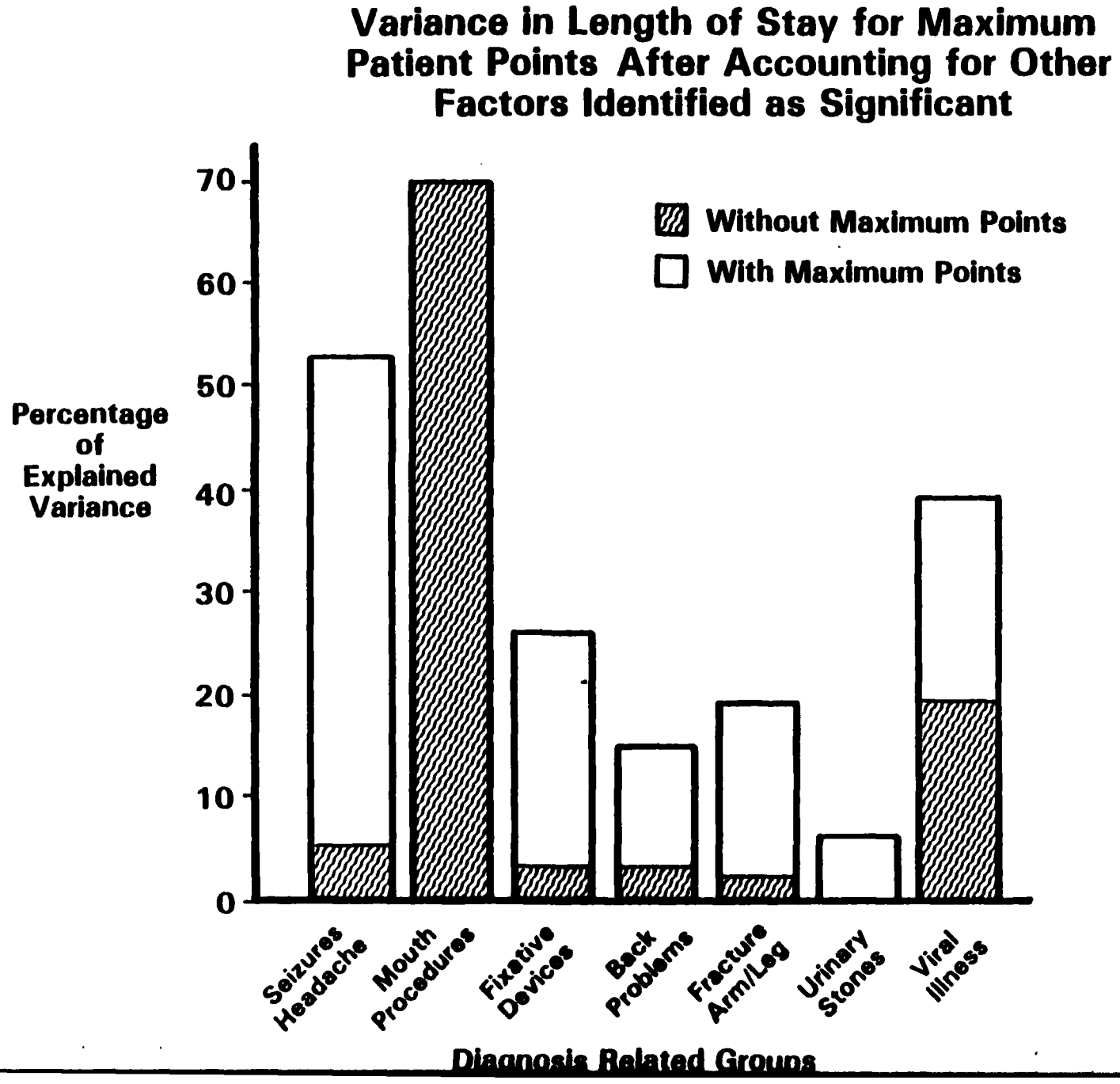

Variance in Length of Stay for Maximum Patient Points After Accounting for Other Factors Identified as Significant
Without Maximum Points
With Maximum Points
Percentage of Explained Variance
70
60
50
40
30
20
10
0
Seizures Headache
Mouth Procedures
Fixative Devices
Back Problems
Fracture Arm/Leg
Urinary Stones
Viral Illness
Diagnosis Related Groups

TABLE 14

VARIANCE IN LENGTH OF PATIENT STAY ACCOUNTED FOR BY MAXIMUM PATIENT CLASSIFICATION POINTS AFTER ACCOUNTING FOR OTHER FACTORS IDENTIFIED AS BEING SIGNIFICANT

DRG	Cases	Other Variables	Without Maximum Points	Added by Maximum Points	Total
25	39	Type of Admission Number of Procedures Number of Diagnoses Sex	4.91	47.53*	52.44
169	27	Type of Admission Number of Procedures Number of Procedures Enlisted Status Age	69.95	0.03	69.98
231	22	Type of Admission Number of Diagnoses Number of Procedures	2.63	23.76*	26.39
243	130	Type of Admission Number of Procedures	2.68	11.82*	14.50
254	33	Number of Procedures Type of Admission Number of Diagnoses	1.9	17.1*	19.0
324	14	---	---	5.75	5.75
421	22	Number of Diagnoses Sex	18.61	19.81*	38.42

*$p \leq .05$.

FIGURE 1

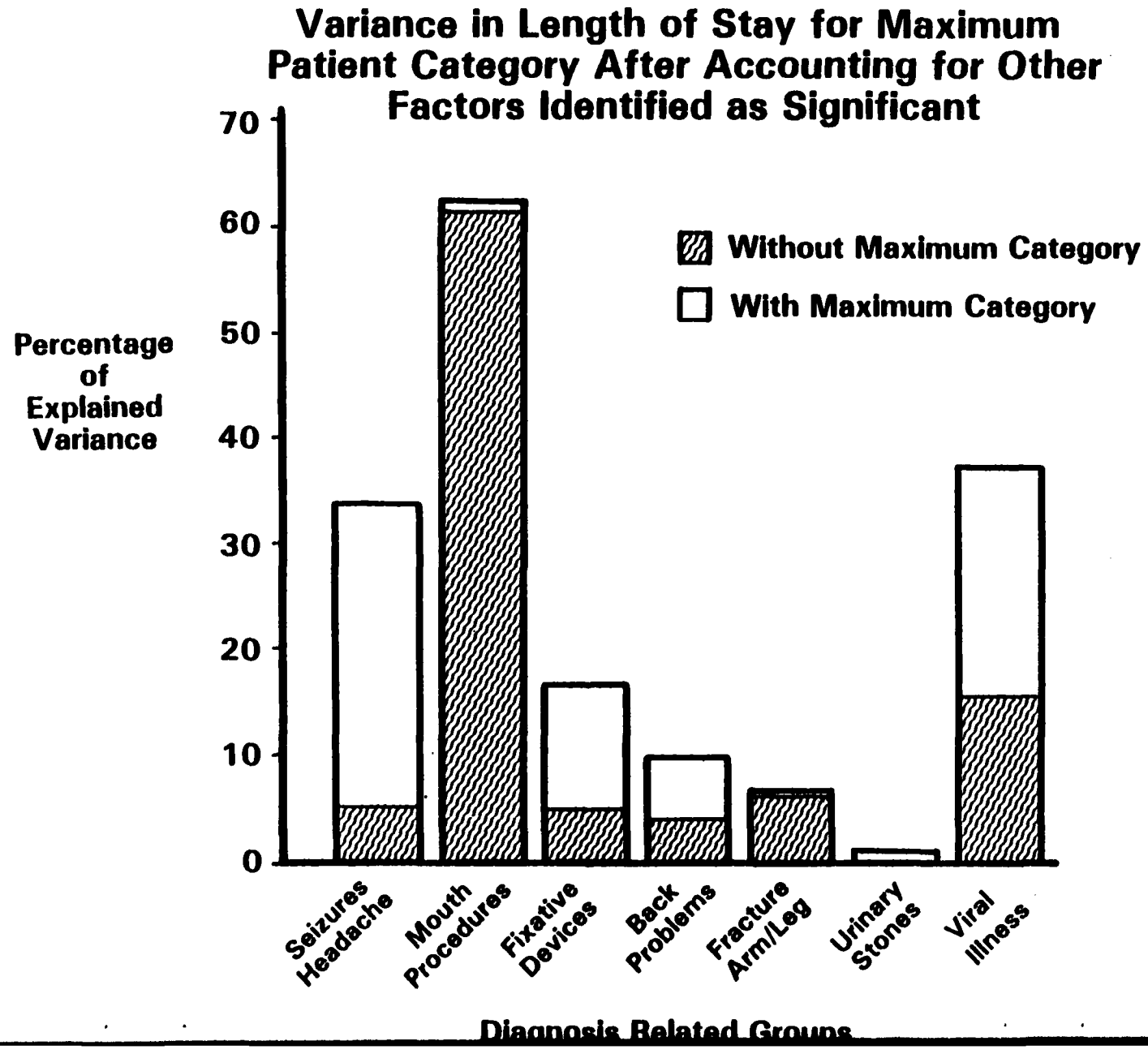

Variance in Length of Stay for Maximum Patient Category After Accounting for Other Factors Identified as Significant
Percentage of Explained Variance
70
60
50
40
30
20
10
0
Without Maximum Category
With Maximum Category
Seizures Headache
Mouth Procedures
Fixative Devices
Back Problems
Fracture Arm/Leg
Urinary Stones
Viral Illness
Diagnosis Related Groups

TABLE 13

VARIANCE IN LENGTH OF STAY ACCOUNTED FOR BY MAXIMUM PATIENT CATEGORY AFTER ACCOUNTING FOR OTHER FACTORS IDENTIFIED AS BEING SIGNIFICANT

			Explained Variance (Percent)		
DRG	Cases	Other Variables	Without Maximum Points	Added by Maximum Points	Total
25	41	Admission Type Number of Procedures Number of Diagnoses Sex	5.39	28.66*	34.05
169	47	Admission Type Number of Procedures Enlisted Status Age	61.56	0.43	61.99
231	46	Admission Type Number of Diagnoses Number of Procedures	4.88	11.72*	16.60
243	156	Admission Type Number of Procedures	3.95	5.55*	9.5
254	61	Number of Procedures Admission Type Number of Diagnoses	6.78	0.38	7.16
324	19	---	---	1.05	1.05
421	23	Number of Diagnoses	15.82	22.49*	38.31

*$p \leq .05$.

classification category and points to patient length of stay was analyzed. The independent variables included in each analysis were those identified as being significantly related to length of stay in Chapter 3. A multiple regression analysis was conducted to test this hypothesis and partial F test was used to test the significance of the additional explained variance. The results of this regression analysis are summarized in Table 13 and Figure 1.

The maximum patient classification category accounted for a significant amount of additional variance for four of the seven DRGs selected for analysis (DRGs 25, 231, 243, 421). The percent of additional variance explained for these DRGs ranged from 5.5% for DRG 243 to 28.7% for DRG 25.*

Similar results were obtained using the maximum patient classification points (see Table 14 and Figure 2). The maximum points data explained a significant amount of variation for five of the seven DRGs tested. These five included the four DRGs with significant results for maximum classification category (DRGs 25, 231, 243, 421) plus DRG 254. The additional variance explained by maximum points for these DRGs

---

*The results for DRG 25 were affected by the existence of 1 case with a length of stay of 21 days. Because this was a pilot study with a small sample size and because no a priori criteria had been established for dealing with outliers, this case was left in the analysis.

TABLE 12

VARIANCE IN LENGTH OF PATIENT STAY EXPLAINED BY MAXIMUM PATIENT CLASSIFICATION POINTS, BY SELECTED DRG

DRG	Number of Cases	Explained Variance (percent)
25	39	30.46*
169	27	6.85
231	22	24.02*
243	130	11.05*
254	33	16.58*
324	14	5.75
421	22	16.43**

* Statistically significant at $p \leq .05$.
** Statistically significant at $p \leq .10$.

AVERAGE LENGTH OF STAY, STANDARD DEVIATION,
COEFFICIENT OF VARIATION, AND NUMBER OF CASES, BY DRG,
NAVAL HOSPITALS, 1982

DRG	MEAN	STD DEV	COEF OF VAR	CASES
47	3.9	6.1	154.9	653
48	2.9	2.6	87.9	261
49	16.1	13.8	85.4	76
50	4.6	2.5	54.0	90
51	4.0	3.6	90.4	27
52	5.3	2.0	36.7	35
53	4.1	4.9	119.9	324
54	3.3	2.9	88.4	45
55	2.8	4.5	158.1	1444
56	2.5	3.1	126.5	2150
57	3.1	2.0	63.3	211
58	2.0	0.8	43.2	43
59	2.5	1.5	63.1	1000
60	1.9	1.1	56.8	1030
63	6.7	11.8	175.3	191
64	7.8	11.5	147.6	181
65	4.9	6.6	135.9	172
66	3.4	2.6	78.2	113
67	4.7	1.4	30.6	13
68	4.5	4.5	99.1	83
69	3.3	3.0	91.4	1018
70	1.6	1.6	102.1	1998
71	2.2	1.5	68.7	101
72	2.1	1.9	91.8	175
73	3.2	4.5	138.6	600
74	2.4	2.5	104.5	210
75	13.3	12.2	91.9	594
76	16.1	11.6	71.6	35
77	10.8	12.7	117.9	91
78	10.7	7.0	64.8	63
79	11.5	9.2	80.1	31
80	10.7	12.9	121.3	115
81	8.2	7.8	95.6	21
82	10.5	12.3	117.3	592
83	4.0	.	.	1
84	1.7	1.0	62.0	6
85	8.2	8.4	102.7	53
86	5.2	6.4	122.8	110
87	13.2	18.9	143.2	100
88	7.3	7.1	97.7	816
89	8.1	7.5	92.5	311
90	5.1	3.9	76.8	1041
91	3.9	2.9	73.7	552
92	8.1	8.9	110.0	36

AVERAGE LENGTH OF STAY, STANDARD DEVIATION, COEFFICIENT OF VARIATION, AND NUMBER OF CASES, BY DRG, NAVAL HOSPITALS, 1982

DRG	MEAN	STD DEV	COEF OF VAR	CASES
93	8.9	11.4	128.5	112
94	10.2	15.1	148.9	13
95	5.3	4.6	85.7	109
96	5.6	4.5	80.5	313
97	4.2	3.8	90.7	1230
98	3.3	2.0	62.6	1512
99	6.8	11.5	169.2	57
100	3.9	4.5	115.8	217
101	5.6	4.8	87.2	109
102	4.3	5.0	118.4	276
105	28.9	19.6	67.8	45
107	14.3	6.7	46.7	90
108	17.6	14.8	84.1	11
109	13.5	11.7	86.8	19
110	21.7	13.3	61.1	46
111	15.3	8.4	55.0	156
112	11.2	10.2	91.0	161
113	33.2	20.5	61.7	15
114	11.1	12.2	109.5	9
115	10.5	9.4	90.3	15
116	7.6	5.5	72.6	32
117	7.7	6.2	80.3	6
119	4.5	2.1	46.5	182
120	18.4	17.5	95.2	22
121	13.6	9.1	66.4	123
122	10.7	7.6	71.1	760
123	5.1	6.2	121.3	84
126	27.1	16.9	62.4	21
127	7.2	7.4	104.0	640
128	10.4	6.9	66.1	242
129	8.2	14.1	171.8	105
130	6.9	9.0	131.1	186
131	4.7	6.9	146.0	528
132	6.0	6.2	104.0	515
133	4.7	6.6	142.5	741
134	5.5	5.8	106.5	634
135	5.1	4.8	93.0	97
136	4.3	4.9	114.9	188
137	2.9	2.8	96.9	146
138	4.9	4.4	90.1	387
139	3.5	3.7	106.9	501
140	4.8	3.6	74.2	1040
141	4.7	4.3	91.9	105
142	3.8	4.3	113.2	270

AVERAGE LENGTH OF STAY, STANDARD DEVIATION, COEFFICIENT OF VARIATION, AND NUMBER OF CASES, BY DRG, NAVAL HOSPITALS, 1982

DRG	MEAN	STD DEV	COEF OF VAR	CASES
143	3.6	3.4	94.3	1413
144	6.6	8.2	125.6	153
145	4.8	6.6	138.4	284
146	28.0	17.1	60.8	21
147	17.4	10.2	58.4	64
148	21.5	14.6	68.0	216
149	15.1	10.7	71.0	295
150	16.9	14.7	87.2	39
151	9.6	9.6	100.4	117
152	9.6	6.2	65.0	113
153	8.0	6.9	86.3	264
154	19.0	18.0	94.6	108
155	11.0	10.7	97.3	281
156	4.7	3.4	72.7	77
157	7.4	8.5	114.2	87
158	4.5	4.0	89.0	948
159	6.0	4.3	72.6	90
160	3.8	2.6	67.3	769
161	4.9	3.3	67.2	226
162	3.8	2.6	69.1	2450
163	1.6	1.4	85.4	765
164	13.9	8.9	64.2	44
165	9.2	6.3	68.3	247
166	8.0	6.6	82.5	61
167	4.6	2.5	54.8	1164
168	8.2	11.0	133.2	73
169	5.9	5.5	92.3	974
170	14.4	14.9	103.3	60
171	6.9	7.2	104.0	349
172	11.2	13.2	118.2	150
173	10.4	13.9	134.3	162
174	7.0	6.4	90.8	273
175	4.9	4.5	90.4	504
176	6.8	8.3	122.0	29
177	7.3	4.2	58.0	63
178	4.3	3.8	87.0	235
179	8.2	10.1	122.6	214
180	9.4	11.2	118.8	60
181	5.4	4.6	84.5	194
182	5.1	5.9	115.5	625
183	3.7	3.7	101.6	2753
184	3.0	2.8	93.4	1226
185	4.4	7.1	162.9	664
186	2.3	1.8	79.6	87

AVERAGE LENGTH OF STAY, STANDARD DEVIATION, COEFFICIENT OF VARIATION, AND NUMBER OF CASES, BY DRG, NAVAL HOSPITALS, 1982

DRG	MEAN	STD DEV	COEF OF VAR	CASES
187	2.5	2.7	110.0	384
188	4.2	5.7	135.2	107
189	3.7	4.9	131.9	657
190	2.3	3.0	129.6	203
191	28.8	21.4	74.3	35
192	26.8	15.7	58.7	13
193	20.9	11.4	54.4	15
194	15.9	12.4	78.1	37
195	16.7	10.1	60.4	38
196	12.5	8.1	64.6	26
197	11.0	8.4	76.2	203
198	6.5	3.6	55.8	1128
199	20.1	16.6	82.9	21
200	10.0	17.5	175.7	69
201	29.8	20.6	69.1	8
202	13.8	10.8	78.5	172
203	9.2	9.2	100.0	131
204	8.8	9.3	105.1	286
205	7.6	7.1	92.7	485
206	5.4	6.7	124.1	409
207	6.2	6.8	110.1	81
208	4.5	4.4	96.4	333
209	20.5	13.7	66.9	111
213	32.4	28.7	88.4	20
214	24.3	19.2	79.1	44
215	19.0	16.5	86.8	599
216	11.8	18.5	156.8	25
217	20.4	21.2	104.2	245
221	22.6	17.5	77.1	11
222	9.4	9.4	99.5	223
223	10.3	7.5	72.7	4
224	5.5	3.7	66.9	318
225	4.9	6.0	122.1	440
226	13.0	13.2	101.7	41
227	6.5	9.0	139.6	552
228	2.0	1.1	54.5	307
229	4.3	5.5	128.6	410
231	5.1	9.0	176.5	848
232	4.1	4.0	97.7	1503
233	20.0	18.2	90.9	220
234	7.8	8.7	111.7	2721
235	19.0	20.2	106.3	166
236	17.1	18.4	107.5	155
237	10.1	11.1	109.2	37

AVERAGE LENGTH OF STAY, STANDARD DEVIATION, COEFFICIENT OF VARIATION, AND NUMBER OF CASES, BY DRG, NAVAL HOSPITALS, 1982

DRG	MEAN	STD DEV	COEF OF VAR	CASES
238	13.6	16.3	119.8	106
239	7.7	10.4	135.1	143
240	9.9	11.5	115.4	56
241	7.7	7.9	103.5	202
242	11.1	15.6	140.4	50
243	7.3	8.5	117.4	2655
244	6.9	6.3	91.1	40
245	4.6	5.7	124.9	217
246	5.5	7.6	139.3	62
247	4.2	6.9	165.9	287
248	4.0	5.3	134.2	354
249	4.7	8.0	168.4	590
250	7.2	14.3	199.6	51
251	3.5	5.8	165.7	585
252	1.9	2.2	117.7	162
253	9.7	12.7	131.0	110
254	3.7	5.4	149.1	2264
255	3.4	5.0	145.5	285
256	3.6	5.5	152.7	703
257	13.6	12.0	88.2	33
258	8.9	3.8	42.3	216
259	13.8	10.8	78.2	8
260	5.6	5.3	93.6	109
261	4.8	4.6	94.5	157
262	1.9	2.5	132.9	554
263	26.3	19.8	75.4	22
264	14.9	13.1	87.6	57
265	16.7	15.7	93.8	40
266	9.9	11.9	120.8	352
267	5.4	4.3	79.7	545
268	3.7	3.9	105.1	427
269	10.0	13.6	136.2	91
270	5.5	5.7	104.7	699
271	12.8	13.4	104.2	61
272	10.8	11.3	104.4	44
273	9.1	10.1	111.9	175
274	9.2	10.3	112.0	112
275	8.3	11.0	131.5	96
276	3.5	2.6	73.4	406
277	6.5	5.2	80.9	184
278	5.4	4.9	91.1	1441
279	3.6	2.2	62.5	334
280	3.4	4.9	144.4	197
281	3.6	5.5	152.1	910

AVERAGE LENGTH OF STAY, STANDARD DEVIATION, COEFFICIENT OF VARIATION, AND NUMBER OF CASES, BY DRG, NAVAL HOSPITALS, 1982

DRG	MEAN	STD DEV	COEF OF VAR	CASES
282	2.3	3.2	135.0	143
283	4.6	5.0	108.7	118
284	3.3	4.5	136.7	1418
285	35.8	14.4	40.1	25
286	16.1	15.4	95.3	23
287	17.2	13.3	77.6	15
288	12.0	10.7	89.5	22
289	10.5	8.9	84.9	12
290	4.7	3.2	67.5	291
291	3.5	4.4	126.3	50
292	19.1	19.1	99.7	22
293	6.7	8.0	119.6	42
294	7.4	6.1	82.3	668
295	6.9	7.0	100.6	460
296	7.2	8.4	115.9	223
297	8.9	11.6	129.7	363
298	5.7	5.2	90.8	388
299	7.7	12.2	157.7	50
300	9.2	11.8	128.6	70
301	7.2	9.5	131.5	250
303	20.4	13.1	64.4	73
304	10.9	7.5	69.1	68
305	10.3	8.1	78.9	323
306	8.9	6.0	67.4	38
307	6.5	5.7	88.1	76
308	5.4	4.3	79.3	38
309	5.6	10.6	190.3	108
310	5.7	5.3	93.1	84
311	3.5	2.6	73.7	196
312	7.8	4.3	55.4	5
313	6.5	5.4	82.9	87
314	3.4	3.8	111.1	24
315	11.3	12.6	111.7	36
316	9.7	10.0	102.3	127
317	2.0	.	.	1
318	9.0	12.3	136.5	64
319	4.5	6.2	139.6	162
320	7.2	6.2	85.7	170
321	4.7	4.2	88.0	600
322	3.4	3.0	88.0	200
323	4.3	3.9	91.2	75
324	2.7	2.5	90.4	676
325	6.0	7.7	128.3	70
326	5.0	7.2	143.6	217

AVERAGE LENGTH OF STAY, STANDARD DEVIATION, COEFFICIENT OF VARIATION, AND NUMBER OF CASES, BY DRG, NAVAL HOSPITALS, 1982

DRG	MEAN	STD DEV	COEF OF VAR	CASES
327	3.2	4.8	152.9	67
328	3.3	2.1	64.7	37
329	4.3	6.8	157.7	146
330	1.7	1.0	58.2	18
331	6.7	8.7	130.3	94
332	4.6	5.7	123.7	282
333	3.9	4.5	115.0	88
334	16.8	8.9	52.8	11
335	13.4	6.5	49.0	50
336	6.0	3.2	52.5	244
337	5.5	3.6	65.3	370
338	7.0	8.6	123.4	46
339	3.2	2.2	69.2	726
340	1.8	1.1	60.8	323
341	5.9	6.7	113.4	120
342	1.9	1.4	71.6	418
343	1.3	0.7	52.2	243
344	12.3	10.4	84.3	65
345	2.8	3.4	122.4	71
346	13.2	17.5	132.8	132
347	9.3	14.4	155.1	163
348	3.7	5.2	141.2	95
349	2.0	1.7	85.9	186
350	5.3	4.4	83.9	561
352	3.6	5.6	156.2	303
353	13.8	11.2	81.6	44
354	9.0	7.1	78.9	255
355	6.2	2.9	46.1	1675
356	6.8	3.2	46.9	245
357	15.4	13.1	85.3	24
358	5.4	2.7	50.2	713
359	2.4	1.4	55.9	804
360	3.4	5.6	166.8	279
361	2.5	1.8	72.5	1354
362	1.9	0.6	33.2	648
363	3.4	3.4	98.2	105
364	1.9	1.0	51.2	1814
365	7.3	10.1	138.1	244
366	7.0	9.2	131.2	78
367	5.1	9.8	193.2	248
368	4.7	2.8	58.9	529
369	2.2	2.3	106.2	920
370	7.4	5.6	76.2	649
371	5.4	4.1	76.9	3659

AVERAGE LENGTH OF STAY, STANDARD DEVIATION, COEFFICIENT OF VARIATION, AND NUMBER OF CASES, BY DRG, NAVAL HOSPITALS, 1982

DRG	MEAN	STD DEV	COEF OF VAR	CASES
372	4.6	5.8	126.9	1576
373	3.0	2.2	72.9	19874
374	3.5	2.8	79.5	1313
375	5.6	4.6	81.0	11
376	3.5	2.2	62.0	150
377	2.9	3.4	118.9	125
378	4.5	1.7	37.6	318
379	2.0	3.6	176.0	825
380	1.7	1.4	81.5	318
381	1.5	1.1	73.2	1765
383	3.5	3.1	89.4	1392
384	3.2	6.1	189.7	672
385	3.9	9.5	245.8	443
386	16.8	18.7	111.3	141
387	14.8	16.4	110.6	139
388	10.1	11.1	110.1	565
389	5.0	4.6	91.4	1403
390	4.1	3.0	72.0	475
391	3.1	1.7	56.0	25217
392	16.2	14.9	91.8	45
393	6.5	3.1	47.8	4
394	3.8	4.9	128.2	170
395	5.3	6.9	130.7	431
396	3.7	3.5	93.4	86
397	6.8	8.3	122.5	141
398	9.1	12.3	136.0	38
399	5.3	5.6	105.4	212
400	22.2	19.4	87.6	78
401	16.1	12.7	79.0	8
402	8.2	14.0	171.2	39
403	14.2	14.1	99.5	193
404	10.4	15.8	152.6	350
405	6.8	11.0	161.7	71
406	17.2	12.3	71.8	21
407	8.5	9.1	106.4	37
408	16.5	18.1	109.7	25
409	14.7	18.1	123.0	39
410	3.7	5.0	135.1	157
411	7.1	9.3	130.3	103
412	5.1	4.7	91.5	11
413	11.4	13.6	119.4	120
414	6.2	8.7	140.8	290
415	12.6	14.0	111.7	212
416	12.6	11.9	93.9	55

AVERAGE LENGTH OF STAY, STANDARD DEVIATION, COEFFICIENT OF VARIATION, AND NUMBER OF CASES, BY DRG, NAVAL HOSPITALS, 1982

DRG	MEAN	STD DEV	COEF OF VAR	CASES
417	6.9	4.3	61.7	55
418	6.7	6.9	102.4	219
419	9.0	5.5	61.2	31
420	7.1	10.0	139.4	91
421	3.9	3.4	87.4	1070
422	2.9	1.9	66.5	544
423	5.0	6.7	133.3	138
424	11.5	15.7	136.2	79
425	7.0	11.6	165.4	577
426	9.8	14.2	145.4	623
427	6.7	11.1	166.0	790
428	12.5	16.8	134.2	1571
429	12.4	16.6	134.0	120
430	26.4	25.4	96.3	1136
431	16.6	16.3	98.0	71
432	8.1	13.0	161.2	159
434	5.9	10.0	171.4	163
435	4.4	7.3	165.0	81
436	8.9	14.1	158.0	234
437	4.1	8.9	215.4	705
438	9.0	13.9	155.3	5594
439	19.7	20.8	105.5	33
440	13.3	19.9	149.1	123
441	5.6	6.6	116.8	40
442	13.6	16.0	117.0	63
443	7.7	11.8	153.9	261
444	7.2	13.3	184.1	83
445	3.9	6.3	160.5	421
446	2.7	3.0	111.3	70
447	3.1	3.3	106.6	68
448	3.8	4.3	111.2	13
449	4.2	6.3	150.2	175
450	2.5	3.9	155.0	726
451	1.7	1.4	86.9	369
452	7.8	12.5	159.7	52
453	4.2	6.0	143.3	246
454	4.4	5.4	123.0	42
455	2.5	2.8	114.7	328
456	4.1	4.7	114.8	15
458	21.5	15.5	72.0	51
459	13.4	11.8	88.3	35
460	7.8	7.7	98.6	205
461	5.8	8.4	145.9	385
462	7.9	13.0	165.7	34

AVERAGE LENGTH OF STAY, STANDARD DEVIATION, COEFFICIENT OF VARIATION, AND NUMBER OF CASES, BY DRG, NAVAL HOSPITALS, 1982

DRG	MEAN	STD DEV	COEF OF VAR	CASES
463	9.6	11.1	115.5	41
464	5.7	5.7	98.6	165
465	2.1	1.8	82.7	7
466	2.2	5.7	252.9	1017
467	3.1	4.9	159.5	1991
				======
				196916

APPENDIX B

APPENDIX B

AVERAGE LENGTH OF STAY, STANDARD DEVIATION, AND NUMBER OF CASES BY DRG SUBGROUPS

DRG	Subgroup	Mean	Std. Dev.	N
1	Number of procedures ≤ 1	15.1	14.4	36
	Number of procedures > 1	27.5	21.5	76
8	Direct admission	3.0	5.5	166
	Direct admission, active duty, not a large teaching hospital	3.4	3.5	142
	Direct admission, active duty, large teaching hospital	5.9	10.6	142
	Admitted by transfer	29.4	33.4	7
12	Age < 18	5.8	9.1	27
	Age ≥ 18	11.0	12.8	139
13	Discharged	7.3	8.9	82
	Transferred to another hospital	2.1	2.2	8
15	Number of diagnoses ≤ 1	3.6	3.5	187
	Number of diagnoses > 1	5.0	5.5	130
19	CONUS hospital	7.4	12.0	369
	Overseas hospital	3.1	3.8	60
20	Direct admission, number of diagnoses = 1, number of procedures = 0	6.5	4.7	365
	Direct admission, number of diagnoses = 1, number of procedures 0	9.1	6.6	22
	Direct admission, number of diagnoses 1, number of procedures = 0	9.4	10.4	112
	Direct admission, number of diagnoses 1, number of procedures 0	12.4	7.3	44
	Admitted by transfer	20.6	22.5	15
21	Number of diagnoses ≤ 2	3.6	2.1	242
	Number of diagnoses > 2	5.1	5.5	21
24	Number of diagnoses ≤ 2	5.1	6.5	89
	Number of diagnoses > 2	8.8	13.3	77

)RG	Subgroup	Mean	Std. Dev.	N
25	Direct admission, number of procedures = 0, not a teaching hospital, number of diagnoses ≤ 1	4.0	5.3	478
	Direct admission, number of procedures = 0, not a teaching hospital, number of diagnoses > 1, male	6.1	6.6	95
	Direct admission, number of procedures = 0, not a teaching hospital, female	3.9	2.9	80
	Direct admission, number of procedures = 0, large teaching hospital	6.8	11.1	232
	Direct admission, number of procedures = 0	6.7	9.3	156
	Admitted by transfer	13.0	11.5	55
26	Direct admission	2.7	3.5	489
	Admitted by transfer	9.4	9.3	10
28	Direct admission, not a large teaching hospital	2.8	3.3	100
	Direct admission, a large teaching hospital	6.6	14.5	56
	Admitted by transfer	20.4	21.9	31
29	Number of procedures = 0, not a large teaching hospital, direct admission	2.2	5.5	268
	Number of procedures = 0, not a large teaching hospital, admitted by transfer	8.0	13.3	18
	Number of procedures = 0, large teaching hospital, discharged	8.4	15.6	105
	Number of procedures = 0, large teaching hospital, transferred to another hospital	25.3	2.1	3
	Number of procedures > 0	14.1	22.5	41
30	Not a large teaching hospital	1.4	1.0	170
	Large teaching hospital	2.7	4.5	105
31	Number of procedures = 0, number of diagnoses ≤ 2	1.5	0.8	74
	Number of procedures = 0, number of diagnoses > 2	2.9	6.1	91
	Number of procedures > 0	6.6	11.5	34

G	Subgroup	Mean	Std. Dev.	N
3	Other than active duty	1.2	0.5	192
	Active duty	1.7	1.0	37
5	Direct admission	4.1	5.3	253
	Admitted by transfer	15.5	12.9	23
6	Direct admission	9.3	6.7	89
	Admitted by transfer	17.8	4.8	12
9	Not a large teaching hospital, number of diagnoses $\leq$ 1	2.8	1.8	510
	Not a large teaching hospital, number of diagnoses > 1	3.5	2.7	151
	Large teaching hospital	4.0	4.5	462
0	Number of procedures $\leq$ 1	2.1	1.9	501
	Number of procedures > 1	2.7	1.8	46
	Large teaching hospital	3.7	4.3	115
7	Direct admission, not a large teaching	2.3	2.7	336
	Direct admission, large teaching hospital, excludes enlisted	3.2	3.4	105
	Direct admission, large teaching hospital, enlisted	4.4	4.6	146
	Admitted by transfer	12.3	13.6	66
3	Excludes enlisted	3.2	2.4	141
	Enlisted	4.7	6.1	183
5	Direct admission, number of procedures $\leq$ 1,	2.2	1.6	486
	Direct admission, number of procedures $\leq$ 1, active duty, number of diagnoses = 1	2.4	2.2	424
	Direct admission, number of procedures $\leq$ 1, active duty, number of diagnoses 1	3.7	4.6	52
	Direct admission, number of procedures > 1	3.2	6.1	470
	Admitted by transfer	16.7	11.9	22
6	Excludes enlisted	2.1	1.7	837
	Enlisted	2.7	3.7	1313
5	Not a large teaching hospital	3.9	3.5	107
	Large teaching hospital	6.5	9.6	65

DRG	Subgroup	Mean	Std. Dev.	N
69	Number of diagnoses ≤ 1	3.0	2.5	812
	Number of diagnoses > 1, active duty	4.4	5.8	160
70	Exludes enlisted	1.5	1.6	1945
	Enlisted	2.8	1.1	53
72	Exludes enlisted	1.7	0.9	57
	Enlisted	2.2	2.2	118
73	Direct admission, number of diagnoses = 1. excludes enlisted, number of procedures = 0	3.0	2.5	56
	Direct admission, number of diagnoses = 1, excludes enlisted, number of procedures > 0	2.1	1.0	91
	Direct admission, number of diagnoses = 1, enlisted	3.0	4.6	283
	Direct admission, number of diagnoses > 1	3.7	5.4	141
	Admitted by transfer	6.7	6.2	29
74	Age < 3	3.0	3.4	69
	Age $\geq$ 3	2.1	1.9	141
75	Number of procedures $\leq$ 2	11.9	11.0	484
	Number of procedures > 2	19.3	15.2	110
82	Number of procedures $\leq$ 1	9.6	11.5	511
	Number of procedures > 1	16.0	15.4	81
88	Age < 60, number of diagnoses 3	6.0	5.5	305
	Age $\geq$ 60, number of diagnoses 3	7.0	6.1	359
	Number of diagnoses 3	10.6	10.5	152
89	Number of diagnoses $\leq$ 2	7.0	6.6	160
	Number of diagnoses > 2	9.2	8.1	151
90	Number of diagnoses $\leq$ 1	4.9	3.5	848
	Number of diagnoses > 1, excludes enlisted	5.2	4.2	75
	Number of diagnoses > 1, enlisted	6.9	5.8	118
91	Excludes enlisted	3.6	2.7	493
	Enlisted	5.9	3.4	59
96	Number of diagnoses $\leq$ 3	5.2	4.1	251
	Number of diagnoses > 3	7.2	5.7	62

DRG	Subgroup	Mean	Std. Dev.	N
98	Number of diagnoses = 1	3.1	1.8	1070
	Number of diagnoses > 1	3.7	2.5	442
100	Non-teaching hospital	2.8	2.3	76
	Teaching hospital	4.5	5.2	141
102	CONUS hospital	4.4	5.2	243
	Overseas hospital	3.1	3.2	33
119	Male	4.9	2.4	107
	Female	4.0	1.4	75
122	Number of procedures = 0, excludes enlisted	10.6	7.1	222
	Number of procedures = 0, enlisted	9.6	5.4	306
	Number of procedures > 0	12.2	9.9	232
127	Number of diagnoses $\leq$ 2	6.3	6.1	266
	Number of diagnoses > 2	7.8	8.2	374
128	Male, number of diagnoses 1	10.0	7.8	84
	Female, number of diagnoses 1	7.6	5.2	50
	Number of diagnoses > 1	12.1	6.4	108
131	Number of procedures = 0	5.1	7.4	301
	Number of procedures > 0	4.1	6.0	227
133	Direct admission, number of diagnoses = 1, number of procedures = 0	5.3	8.6	143
	Direct admission, number of diagnoses = 1, number of procedures > 0	3.1	3.8	255
	Direct admission, number of diagnoses = 1, number of procedures = 0	5.6	7.3	152
	Direct admission, number of diagnoses = 1, number of procedures > 1	3.7	4.3	140
	Admitted by transfer	10.4	10.2	51
134	Direct admission, number of diagnoses = 1, excludes enlisted	3.3	3.0	112
	Direct admission, number of diagnoses = 1, enlisted	5.3	7.1	122
	Direct admission, number of diagnoses 1, non-teaching hospital	6.4	6.3	177
	Direct admission, number of diagnoses 1, teaching hospital	5.3	4.8	206

DRG	Subgroup	Mean	Std. Dev.	N
136	Direct admission	3.6	4.2	170
	Admitted by transfer	10.8	2.3	18
137	Direct admission	2.5	2.0	131
	Admitted by transfer	6.3	5.3	15
138	Number of diagnoses = 1	3.6	2.3	43
	Number of diagnoses > 1, number of procedures = 0	6.2	5.7	106
	Number of diagnoses > 1, number of procedures > 0	4.5	3.8	238
139	Direct admission, number of diagnoses = 1	2.9	3.3	308
	Direct admission, number of diagnoses > 1, number of procedures = 0	3.7	3.5	144
	Direct admission, number of diagnoses > 1, number of procedures = 1	5.0	4.1	37
140	Number of procedures = 0	4.5	3.4	818
	Number of procedures > 0	5.7	4.0	222
142	Excludes enlisted, age $\leq$ 30	2.4	1.8	38
	Excludes enlisted, age $\geq$ 30	3.6	2.8	62
	Enlisted, number of procedures = 0	3.6	3.9	152
	Enlisted, number of procedures > 0	8.8	9.3	18
143	Direct admission, number of diagnoses $\leq$ 2	3.4	3.3	1101
	Direct admission, number of diagnoses > 2	4.3	3.1	279
	Admitted by transfer	5.7	7.6	33
144	Number of diagnoses $\leq$ 2	4.9	3.7	49
	Number of diagnoses > 2	7.4	9.6	104
149	Number of procedures $\leq$ 1	13.1	6.3	132
	Number of procedures > 1	16.7	13.1	163
151	Age < 40	7.6	5.2	77
	Age $\geq$ 40	13.4	14.2	40
154	Number of diagnoses $\leq$ 1	10.6	7.9	10
	Number of diagnoses > 1	19.9	18.5	98

DRG	Subgroup	Mean	Std. Dev.	N
155	Number of procedures ≤ 1	9.7	10.3	170
	Number of procedures > 1	13.0	11.0	111
158	Number of diagnoses = 1, excludes enlisted	3.8	2.5	300
	Number of diagnoses = 1, enlisted	4.3	4.1	414
	Number of diagnoses > 1	5.6	5.0	234
160	Number of procedures ≤ 1	3.7	2.6	677
	Number of procedures > 1	4.4	2.5	92
161	Number of procedures ≤ 1, non-teaching hospital	5.8	3.0	64
	Number of procedures ≤ 1, teaching hospital	4.0	2.8	131
	Number of procedures > 1	6.7	4.1	31
162	Non teaching hospital	4.4	2.8	1113
	Teaching hospital	3.2	2.6	1337
163	Excludes enlisted, age < 11	1.5	1.4	672
	Excludes enlisted, age ≥ 11	2.2	1.0	85
	Enlisted	3.3	1.0	8
165	Number of procedures ≤ 1	8.9	6.3	215
	Number of procedures > 1	11.3	5.9	32
167	Excludes enlisted, age < 40	4.2	2.1	536
	Excludes enlisted, age ≥ 40	5.3	4.2	536
	Enlisted	5.0	2.8	585
169	Direct admission, number of procedures ≤ 1, excludes enlisted	4.2	3.1	166
	Direct admission, number of procedures ≤ 1, excludes enlisted	5.9	5.1	362
	Direct admission, number of procedures > 1, excludes enlisted	4.4	2.0	82
	Direct admission, number of procedures > 1, excludes enlisted	6.1	4.2	50
	Direct admission, number of procedures > 1, enlisted	7.1	6.8	300

DRG	Subgroup	Mean	Std. Dev.	N
171	Number of procedures $\leq$ 1, age < 30, male	7.6	7.0	51
	Number of procedures $\leq$ 1, age < 30, female	3.9	2.9	98
	Number of procedures < 1, age $\geq$ 30	8.0	7.4	90
	Number of procedures > 1, age < 40, excludes enlisted	4.8	4.4	58
	Number of procedures > 1, age < 40 enlisted	10.4	8.3	27
	Number of procedures > 1, age $\geq$ 40	14.5	12.5	25
173	Discharged alive	8.8	11.7	144
	Died	23.1	22.1	18
174	Age < 22	3.1	1.6	16
	Age $\geq$ 22, not a large teaching hospital	6.5	5.4	140
	Large teaching hospital	8.2	7.6	117
175	Not a large teaching hospital, discharged	4.7	3.9	297
	Not a large teaching hospital, transferred to another hospital	2.0	2.0	21
	Large teaching hospital	5.7	5.3	186
178	Number of diagnoses = 1, non-teaching hospital	3.2	2.8	113
	Number of diagnoses = 1, teaching hospital	5.2	3.8	61
	Number of diagnoses 1	5.6	4.7	61
181	Age < 40	4.0	3.5	69
	Age $\geq$ 40	6.2	4.9	125
182	Age < 40,	3.0	3.4	146
	Age < 40, not active duty	4.1	4.2	167
	Age = 40, active duty	6.6	7.1	312
183	Direct admission, age < 50, number of diagnoses = 1, number of procedures = 0	3.0	2.9	1635
	Direct admission, age < 50, number of diagnoses = 1, number of procedures > 0	4.7	5.1	215
	Direct admission, age < 50, number of diagnoses > 1, number of procedures = 0	3.7	3.2	336
	Direct admission, age < 50, number of diagnoses > 1, number of procedures > 0	6.1	5.3	96
	Direct admission, age $\geq$ 50, not a large teaching hospital	4.1	3.8	292
	Direct admission, age $\geq$ 50, large teaching hospital	5.6	4.8	147
	Admitted by transfer	10.0	7.9	32

DRG	Subgroup	Mean	Std. Dev.	N
224	Excludes enlisted	4.7	2.6	41
	Enlisted	5.7	3.8	277
225	Number of diagnoses = 1	4.1	3.1	315
	Number of diagnoses > 1	7.0	9.9	125
227	Direct admission, number of diagnoses = 1	5.6	6.8	421
	Direct admission, number of diagnoses > 1	7.4	10.3	119
	Admitted by transfer	27.7	25.1	12
228	Excludes enlisted	1.8	1.1	116
	Enlisted	2.2	1.1	191
229	Not a large teaching hospital	2.6	3.1	44
	Large teaching hospital	4.2	4.1	55
	Active duty	4.6	6.0	311
231	Direct admission, number of diagnoses = 1, number of procedures = 1	4.0	6.1	627
	Direct admission, number of diagnoses = 1, number of procedures > 1	9.1	12.5	54
	Direct admission, number of diagnoses > 1, number of procedures = 1	3.9	4.7	74
	Direct admission, number of diagnoses 1, number of procedures > 1	8.8	14.6	86
	Admitted by transfer	42.3	26.3	7
232	Number of procedures = 1	3.5	2.8	866
	Number of procedures = 1, discharged to Med Hold Co	4.7	3.5	133
	Number of procedures > 1, excludes enlisted	3.7	3.5	121
	Number of procedures > 1, enlisted	5.4	5.9	383
233	Number of diagnoses = 1	14.0	11.1	36
	Number of diagnoses > 1	21.1	19.0	184
234	Direct admission, number of diagnoses = 1, discharged	7.0	7.7	2065
	Direct admission, number of diagnoses = 1, transferred to another hospital	15.6	10.6	12
	Direct admission, number of diagnoses > 1, number of procedures $\leq$ 1	8.1	7.5	310
	Direct admission, number of diagnoses > 1, number of procedures > 1	10.4	10.8	273
	Admitted by transfer	19.6	17.1	73

DRG	Subgroup	Mean	Std. Dev.	N
235	Excludes enlisted	13.5	16.5	75
	Enlisted	23.5	21.9	91
236	Number of diagnoses = 1	13.9	18.9	77
	Number of diagnoses > 1	20.3	17.5	78
238	Not a large teaching hospital	9.2	11.9	71
	Large teaching hospital	22.3	20.1	35
243	Direct admission, number of procedures = 0	6.6	7.4	1970
	Direct admission, number of procedures > 0	7.8	9.5	458
	Direct admission, number of procedures > 0, discharged to Med Hold Co	13.0	11.5	43
	Admitted by transfer, number of procedures = 0, not a large teaching hospital	6.9	6.0	62
	Admitted by transfer, number of procedures = 0, large teaching hospital	13.0	15.4	99
	Admitted by transfer, number of procedures > 0, large teaching hospital	17.6	13.3	23
245	Overseas hospital	3.6	3.2	14
	CONUS hospital	6.3	6.5	131
	Discharged to Med Hold Co	1.5	2.2	72
247	Number of diagnoses = 1	4.9	8.4	139
	Number of diagnoses = 1, discharged to Med Hold Co	1.8	2.3	84
	Number of diagnoses > 1	5.8	6.7	64
249	Direct admission	4.2	6.4	328
	Direct admission, discharged to Med Hold Co	3.0	6.5	173
	Admitted by transfer	9.9	12.6	89
251	Number of procedures = 0	3.0	5.9	319
	Number of procedures > 0	3.9	4.1	143
254	Number of procedures = 0, direct admission	3.5	5.0	706
	Number of procedures = 0, direct admission discharged to Med Hold Co	1.8	3.2	786
	Number of procedures = 0, admitted by transfer	7.3	11.1	78
	Number of procedures > 0	5.5	6.2	694

DRG	Subgroup	Mean	Std. Dev.	N
255	Number of diagnoses = 1, number of procedures = 0	2.0	1.9	114
	Number of diagnoses = 1, number of procedures 0	4.0	5.3	135
	Number of diagnoses > 1	5.9	8.2	36
256	Number of procedures = 0, admitted by transfer	8.9	10.2	27
	Number of procedures = 0, direct admission, not a large teaching hospital	3.0	5.2	142
	Number of procedures = 0, direct admission, large teaching hospital	4.3	6.0	125
	Number of procedures = 0, direct admission, discharged to Med Hold Co	1.6	2.6	174
	Number of procedures > 0	4.5	5.7	235
260	Number of procedures = 1	4.4	4.7	83
	Number of procedures > 1	9.5	5.2	26
261	Age < 40	3.4	2.3	82
	Age ≥ 40	6.3	5.7	74
262	Number of procedures = 1	1.8	2.0	525
	Number of procedures > 1	4.0	6.5	29
266	Excludes enlisted	7.9	7.3	144
	Enlisted	11.2	14.1	208
267	Excludes enlisted, non-teaching hospital	4.0	2.1	68
	Excludes enlisted, teaching hospital	3.3	1.8	49
	Enlisted, non- teaching hospital	6.8	5.3	225
	Enlisted, teaching hospital	5.0	3.7	203
268	Not a large teaching hospital	2.7	2.5	163
	Large teaching hospital	4.3	4.5	203
274	Not a large teaching hospital	6.5	8.0	43
	Large teaching hospital	10.9	11.2	69
276	Excludes enlisted, non-teaching hospital	2.3	1.7	86
	Excludes enlisted, teaching hospital	3.4	2.4	153
	Enlisted, CONUS hospital	4.4	3.0	143
	Enlisted, overseas hospital	3.3	1.5	24
277	Non- teaching hospital	6.6	5.1	89
	Teaching hospital	6.3	5.3	95

DRG	Subgroup	Mean	Std. Dev.	N
278	Age < 40, number of diagnoses = 1	5.0	4.3	985
	Age < 40, number of diagnoses > 1	5.6	4.4	195
	Age ≥ 40	6.6	6.8	261
284	Not a large teaching hospital, age > 39, non-teaching hospital	2.8	2.8	124
	Not a large teaching hospital, age > 39, teaching hospital	1.9	1.4	89
	Not a large teaching hospital, age < 40	2.9	2.9	669
	Large teaching hospital. excludes enlisted	3.0	3.3	262
	Large teaching hospital, enlisted	5.3	8.1	274
294	Number of procedures = 0, age < 55, number of diagnoses = 1	5.4	3.9	110
	Number of procedures = 0, age < 55, number of diagnoses 1	7.0	5.1	176
	Number of procedures = 0, age ≥ 55	7.6	6.6	317
	Number of procedures > 0	10.3	7.4	65
295	Excludes enlisted	5.6	4.6	299
	Enlisted, age ≤ 25	10.6	8.8	86
	Enlisted, age > 25	8.0	10.2	75
296	Number of procedures = 0	6.7	8.2	197
	Number of procedures > 0	11.3	8.8	26
297	Discharged	10.1	12.0	312
	Transferred to another hospital	1.9	4.4	51
298	Number of diagnoses ≤ 2	5.3	4.9	331
	Number of diagnoses > 2	7.9	6.3	57
301	Excludes enlisted, direct admission	4.6	6.6	134
	Excludes enlisted, admitted by transfer	15.2	10.4	17
	Enlisted	9.4	11.1	99
305	Direct admission	10.0	7.8	37
	Admitted by transfer	23.7	11.1	6
320	Age < 50	6.2	4.8	77
	Age ≥ 50	8.2	7.1	93
321	Age < 40, male, number of diagnoses = 1	3.8	2.1	307
	Age < 40, male, number of diagnoses 1	5.0	3.2	100
	Age < 40, female	4.1	2.5	407
	Age ≥ 40	6.0	5.2	118

DRG	Subgroup	Mean	Std. Dev.	N
322	Number of procedures = 0	3.8	3.6	137
	Number of procedures > 0	2.6	2.8	63
326	Non teaching hospital	3.9	5.7	97
	Teaching hospital	5.9	8.1	120
336	Number of procedures = 1	5.6	2.3	180
	Number of procedures > 1	7.2	4.6	64
340	Age < 11	1.6	1.0	250
	Age > 11	2.3	1.3	73
342	Number of diagnoses = 1	1.9	1.4	377
	Number of diagnoses > 1	2.5	1.5	41
347	Not a large teaching hospital	5.8	5.4	54
	Large teaching hospital	11.0	16.9	109
350	Number of diagnoses = 1, non-teaching hospital	4.2	3.8	200
	Number of diagnoses = 1, teaching hospital	4.5	2.8	26
	Number of diagnoses = 1, teaching hospital active duty	6.0	4.4	269
	Number of diagnoses > 1	6.2	5.4	135
352	Excludes enlisted	2.0	1.7	106
	Enlisted	4.4	6.6	197
354	Number of procedures = 1	6.5	2.6	42
	Number of procedures > 1	9.5	7.6	213
355	Number of procedures = 1, caucasian	5.5	1.9	566
	Number of procedures = 1, non-caucasian	6.0	2.2	89
	Number of procedures > 1, age < 50	6.4	2.6	859
	Number of procedures > 1, age ≥ 50	7.6	5.3	161
356	Age < 40	6.1	2.6	95
	Age ≥ 40, number of diagnoses = 1	6.6	2.8	86
	Age ≥ 40, number of diagnoses > 1	8.0	4.0	64
358	Number of procedures = 1	5.0	2.0	238
	Number of procedures > 1	5.7	3.0	475
359	Number of procedures = 1	2.2	1.0	618
	Number of procedures > 1, number of diagnoses = 1	2.5	1.4	68
	Number of procedures > 1, number of diagnoses > 1	3.6	2.2	118

DRG	Subgroup	Mean	Std. Dev.	N
360	Not a large teaching hospital	2.6	1.9	195
	Large teaching hospital	5.1	9.6	84
361	Number of procedures $\leq$ 2, excludes enlisted	2.3	1.7	995
	Number of procedures $\leq$ 2, enlisted	2.9	2.0	273
	Number of procedures > 2	3.2	2.3	86
364	Number of procedures = 1	1.8	0.9	1437
	Number of procedures >1	2.1	1.0	345
	Number of procedures >1, active duty	2.6	1.4	32
365	Age < 40	5.2	5.0	194
	Age $\geq$ 40	15.5	18.0	50
366	Discharged alive	4.9	6.4	65
	Died	17.7	13.3	13
367	Direct admission	4.1	7.3	236
	Admitted by transfer	24.2	24.9	12
368	Number of diagnoses = 1	4.6	2.7	403
	Number of diagnoses >1	5.2	3.0	126
369	Direct admission	2.0	2.0	757
	Direct admission, active duty, number of diagnoses = 1	2.4	1.8	98
	Direct admisson, active duty, number of diagnoses >1	3.3	2.6	53
	Admitted by transfer	8.0	7.9	12
370	Number of diagnoses $\leq$ 3	6.9	4.7	276
	Number of diagnoses > 3	7.7	6.2	373
371	Excludes enlisted	5.2	3.4	3321
	Enlisted	6.7	8.2	338
373	Direct admission, CONUS hospital	3.0	1.9	16851
	Direct admission, overseas hospital, excludes enlisted	3.0	1.9	18065
	Direct admission, overseas hospital, enlisted	3.5	4.1	1809
	Admitted by transfer	4.3	2.8	10
374	CONUS hospital, number of diagnoses $\leq$ 3	3.3	1.8	907
	CONUS hospital, number of diagnoses > 3	4.1	4.0	215
	Overseas hospital	4.0	4.3	191

DRG	Subgroup	Mean	Std. Dev.	N
377	Number of procedures = 1	2.2	1.3	104
	Number of procedures >1	6.1	7.0	21
378	Number of procedures ≤ 1	3.9	1.3	138
	Number of procedures > 1	4.9	1.8	180
379	Excludes enlisted	1.8	2.3	707
	Enlisted	3.1	7.5	118
380	Number of diagnoses = 1	1.6	1.1	300
	Number of diagnoses >1	3.4	3.5	18
381	Number diagnoses = 1, excludes enlisted	1.4	0.9	1350
	Number diagnoses = 1, enlisted	1.8	1.5	252
	Number diagnoses > 1	2.1	1.5	163
415	Number of procedures = 1	10.1	11.1	154
	Number of procedures >1	19.0	18.5	58
425	Not a large teaching hospital	5.0	8.0	389
	Large teaching hospital	11.2	15.8	188
432	CONUS hospital, female	3.5	4.3	22
	CONUS hospital, male	11.4	17.8	103
	CONUS hospital, discharged to Med Hold Co	21.2	22.3	25
	Overseas hospital	2.9	3.2	28
440	Number of procedures ≤ 1	8.5	14.0	57
	Number of procedures > 1	17.5	23.1	66
443	Excludes enlisted	5.5	7.5	128
	Enlisted	9.8	14.5	133
444	Not a large teaching hospital	5.6	8.7	50
	Large teaching hospital	9.6	18.1	33
445	Direct admission, not a large teaching hospital	2.8	3.3	280
	Admitted by transfer, large teaching hospital	5.4	9.1	111
	Admitted by transfer	8.7	10.5	30
450	All others	2.2	1.8	342
	Enlisted, CONUS hospital	2.8	5.0	384

DRG	Subgroup	Mean	Std. Dev.	N
451	Age ≤ 10	1.4	1.2	207
	Active duty, age > 10	2.0	1.6	107
	Active duty	2.1	1.8	55
455	Number of diagnoses ≤ 1	2.2	2.6	269
	Number of diagnoses > 1	3.5	3.5	59
461	Direct admission, number of diagnoses ≤ 1	4.1	5.7	247
	Direct admission, number of diagnoses > 1, male	9.1	10.2	55
	Direct admission, number of diagnoses > 1, female	5.5	8.2	69
	Admitted by transfer	23.8	15.9	14
464	Not a large teaching hospital	5.1	4.7	109
	Large teaching hospital	6.9	7.0	56
466	Number of diagnoses ≤ 1, direct admission	1.5	3.7	880
	Number of diagnoses ≤ 1, admitted by transfer	6.6	12.6	71
	Number of diagnoses > 1	7.0	9.4	66
467	Number of diagnoses ≤ 1, direct admission, non-teaching hospital	2.1	2.6	688
	Number of diagnoses ≤ 1, direct admission, not a large teaching hospital	2.9	4.8	236
	Number of diagnoses ≤ 1, direct admission, large teaching hospital	2.6	4.0	352
	Number of diagnoses ≤ 1, direct admission, large teaching hospital, active duty	4.4	6.7	198
	Number of diagnoses ≤ 1, admitted by transfer	6.3	9.1	62
	Number of diagnoses > 1, male, number of procedures = 0	4.5	6.2	135
	Number of diagnoses > 1, male, number of procedures 0	11.1	13.9	21
	Number of diagnoses > 1, female	3.3	4.5	299

END

FILMED

9-85

DTIC